

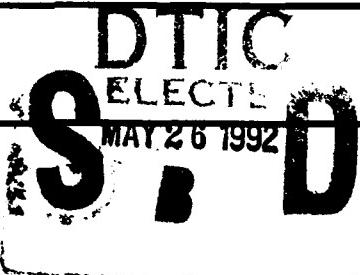
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<p>The purpose of the Resident Research Associateship Program is to (1) provide postdoctoral scientists and engineers or usual promise and ability opportunities for research on problems largely of their own choice, which are compatible with research interests of the sponsoring Air Force Systems Command Laboratories, and (2) to contribute thereby to the overall research effort of the federal labs.</p>			
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NATIONAL RESEARCH COUNCIL
OFFICE OF SCIENTIFIC AND ENGINEERING PERSONNEL
2101 Constitution Avenue Washington, D.C. 20418

ASSOCIATESHIP PROGRAMS

(202) 334-2760
GENERAL INFORMATION
FAX (202) 334-2759

Lt. Col. Claude Cavender
Chief, Research Integration Division
AFOSR/XOI, Building 410
Bolling AFB
Washington, D.C. 20332-6448

RE: Contract No: F49620-89-C-0053

Dear Col. Cavender:

In order to fulfill the obligations of the referenced contract, we are forwarding to you an original and three copies of a report for the Resident Research Associateship Program operated for the U.S. Air Force by the National Research Council.

This report covers the period January 1, 1991-December 31, 1991. Thus we have completed the requirements for an Annual Technical Report.

If further information is needed, please feel free to contact me.

Sincerely yours,

R. H. Manka
Program Administrator

Enclosures

cc: Dr. Helmut Hellwig
Contracting Officer
Mr. Paul Sullivan (w/o enclosure)
Mr. Gary Dwoskin (w/o enclosure)
Dr. Richard Harshman (w/o enclosure)
AFSC File

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NATIONAL RESEARCH COUNCIL

Resident Research Associateship Program

with the AIR FORCE SYSTEMS COMMAND

Annual Report

(Required under Contract No. F49620-89-C-0053)

January 1, 1991, through December 31, 1991

We report here on all Associateship Programs for the U.S. Air Force.

In addition to reporting on activities specifically sponsored under this contract, we also summarize any other current activities of the Air Force Associateship Program such as the termination of Associates who were sponsored under the previous year's contract.

PUBLICITY

The National Research Council, in cooperation with the U.S. Air Force, prepared a booklet describing opportunities for research in the NRC-USAFA Research Associateship Program. The laboratories participating in the program were sent booklets to be distributed by the research staff to persons interested in the program.

In October 1991, publicity materials concerning the 1992 NRC-USAFA Research Associateship Program were distributed to presidents, graduate deans, thesis advisers, and chairmen of appropriate departments of science and engineering of all academic, degree-granting institutions in the United States. Announcements were also sent to selected public and professional news media for publication.

REQUESTS

Through December 1991, the Associateship Programs Office sent application packets to individuals for the 1991 NRC-AFSC Associateship Program in response to requests by persons whose fields of specialization appeared to be appropriate for the research opportunities available in the AFSC laboratories.

COMPETITION

At the request of the U.S. Air Force, the Associateship Programs Office reviews applications in February, June, and October of each year.

February 1991 Review

Forty applications were received by the Associateship Programs Office before the closing date of January 17, 1991. Nine applications were incomplete, one application was withdrawn before review, one was ineligible, and two could not be considered for awards due to a lack of interest in the proposals by the laboratory. Twenty-seven applications were reviewed by the Panel Review Board that met in Washington, D.C., February 28-March 1, 1991. Twenty applicants were recommended for awards and seven were not recommended. Of the 20 recommended candidates, eleven were offered awards and have accepted them, three declined the award offers, and six award offers are still pending.

June 1991 Review

Forty-seven applications were received for the June review. Eight of these applications were incomplete, two were deferred to another review, one was ineligible, and seven could not be considered for awards due to lack of interest in the proposals by the laboratory. Twenty-nine applications were presented for review. All 29 candidates were recommended for awards. Of the 29 recommended candidates, 18 were offered awards and have accepted them, one declined the award offer, and ten award offers are still pending.

October 1991 Review

Thirty-four applications were received for the October review. Six applications were incomplete, one was received too late to be entered into the review, three were ineligible, and one could not be offered an award due to a lack of interest in the proposal by the laboratory. Twenty-three applications were presented for review. Of those presented, 21 were recommended for awards and one was not recommended. Of the 21 recommended candidates, seven were offered awards and have accepted, two have declined award offers, one could not be offered an award due to a lack of funding, and 11 award offers are still pending.

ASSOCIATES' ACTIVITIES

Part I includes information on the NRC-USAF February 1991 Review.

Part II includes information on the June 1991 Review.

Part III includes information on the October 1991 Review.

Part IV includes information on Associates whose tenure terminated during the reporting period, information on renewed Associates, and information on Associates on tenure as of January 1, 1992.

PART I

CANDIDATES WHO HAVE ACCEPTED AWARDS IN THE FEBRUARY 1991 NRC-AFSC
RESEARCH ASSOCIATESHIP PROGRAMS REVIEW

<u>Associates</u>	<u>Advisers</u>	<u>Laboratory</u>	<u>Expected/Actual Starting Date</u>
AMBADI, Satheesh	A. Garscadden	WL	February 10, 1992
BRUNO, John G.	J. L. Kiel	AL	July 1, 1991
HANSEN, Thorkild	A. Yaghjian	RADC	August 23, 1991
KIRKWOOD, Robert	W. J. Burke	GL	September 3, 1991
KOST, Daniel	J. P. Stewart	FJSRL	September 3, 1991
LIRON, ZVI	J. McDougal	AL	August 6, 1991
OLIPHANT, Nevin	D. Konowalow	PL	October 21, 1991
PACHTER, Ruth	R. L. Crane	WRDC	May 6, 1991
SIMMONS, Jeff	T. Nicholas	WRDC	October 15, 1991
TAVARES, Theodore	J.J. S. Shang	WRDC	June 10, 1991
ZAWOROTKO, Michael	J. S. Wilkes	FJSRL	September 3, 1991

RECOMMENDED CANDIDATES WHO HAVE NOT YET BEEN OFFERED AWARDS

CAVDAR, Bulent	K. J. Eisentraut	WRDC	February 3, 1992
LANEY, Culbert	J.J. S. Shang	WRDC	June 1, 1991
MANNINEN, Olavi	D. W. Repperger	AL	April 1, 1991
SPECK, Kenneth	J. J. Kester	FJSRL	March 1, 1991
ZHANG, Yong-Shan	P. A. Kossey	GL	March 15, 1991
ZHOU, Weimin	D. C. Reynolds	WRDC	August 1, 1991

RECOMMENDED CANDIDATES WHO DECLINED AWARDS

KAATZ, Philip	J. J. Kester	FJSRL
MENON, Sarath	T. Nichols	WRDC
TAYLOR, Walter	R. D. Latham	AL

PART II

CANDIDATES WHO HAVE ACCEPTED AWARDS IN THE JUNE 1991 NRC-AFSC
RESEARCH ASSOCIATESHIP PROGRAMS REVIEW

<u>Associates</u>	<u>Advisers</u>	<u>Laboratory</u>	<u>Expected/Actual Starting Date</u>
ARMAN, Moe	K. J. Hendricks	PL	October 21, 1991
BEER, Jeremy	R. Warren	AL	November 1, 1991
EMBRETSON, Susan	W. C. Tirre	AL	January 2, 1992
GANNON, Robert	M. A. Rea	AL	October 1, 1991

HANG, Zhijiang	M. N. Alexander	RL	October 7, 1991
KASPI, Ron	C. I. Huang	WL	October 21, 1991
KAUDERER, Mark	G. A. Brost	RL	October 15, 1991
LOVATO, Julie	H. E. Helin	FJSRL	March 2, 1992
MACLER, Michel	J. J. Kester	FJSRL	February 18, 1992
MATIKAS, Theodore	T. J. Moran	WL	October 3, 1991
NOOKALA, Munichandraiah	R. A. Marsh	WL	May 5, 1992
QUAN, Ralph	S. G. Webb	FJSRL	September 16, 1991
ROCKWELL, Benjamin	D. N. Farrer	AL	September 9, 1991
ROSEN, Joseph	J. L. Horner	RL	February 25, 1992
SHEBILSKI, Wayne	J. W. Regian	AL	January 6, 1992
UNGARISH, Moshe	C. Y. Lee	WL	September 30, 1991
VENKATESWARAN, Anuradha	N. J. Pagano	WL	January 16, 1992
WALCK, Scott	M. S. Donley	WL	May 26, 1992

RECOMMENDED CANDIDATES WHO HAVE NOT YET BEEN OFFERED AWARDS

BYUN, Young	F. L. Schuermeyer	WL	August 1, 1991
DYKES JR, James	J. W. Regian	AL	January 1, 1992
INFIELD, Susan	J. W. Regian	AL	September 3, 1991
KELLY, Michael	L. A. Schlie	PL	June 1, 1991
MCBRIDE, John	J. S. Wilkes	FJSRL	January 1, 1992
NAGPAL, Rajesh	A. Garscadden	WL	July 30, 1991

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NIKOLO, Martin	A. J. Drehman	WL	April 1, 1991
POELKER, Bernard	J. L. Horner	RL	October 1, 1991
SHAHRIAR, Selim	J. L. Horner	RL	September 1, 1991
SPENCER, Thomas	K. J. Hendricks	PL	August 1, 1991

RECOMMENDED CANDIDATE WHO DECLINED THE AWARD OFFER

FRESE, Michael	W. L. Baker	PL
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PART III

CANDIDATES WHO HAVE ACCEPTED AWARDS IN THE OCTOBER 1991 NRC-AFSC
RESEARCH ASSOCIATESHIP PROGRAMS REVIEW

<u>Associates</u>	<u>Advisers</u>	<u>Laboratory</u>	<u>Expected/Actual Starting Date</u>
BOSSERT, David	D. A. Depatie	PL	February 24, 1992
BURROWS, Michael	W. M. Roquemore	WL	January 28, 1992
FRIEDMAN, Lionel	R. A. Soreg	RL	July 1, 1992
GUNTUPALLI, Malakondaia	T. Nicholas	WL	May 1, 1992
KOVANIS, Vassilios	A. Gavrielides	PL	February 17, 1992
SULEMAN, Afzal	V. Venkayya	WL	June 8, 1992
TALWAR, Devki	M. O. Manasreh	WL	May 21, 1992

RECOMMENDED CANDIDATES WHO HAVE NOT YET BEEN OFFERED AWARDS

BEN-MENAHEM, Ari	J. J. Cipar	PL	December 1, 1991
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BLOKHRA, Ratan	J. S. Wilkes	FJSRL	October 1, 1991
DEPALMA, Jude	R. D. Latham	AL	November 15, 1992
ESAYAN, Stepan	A. J. Drehman	RL	December 1, 1991
JIANG, Yuan	R. A. Soref	RL	November 15, 1991
LEE, Norman	J.J. S. Shang	WL	January 2, 1992
PICKETT, Ronald	E. J. Weber	PL	March 2, 1992
SEGALL, Richard	R. S. Albanese	AL	November 15, 1991
SMITH, Augustine	D. H. Katayama	PL	December 1, 1991
YANG, De	D. C. Reynolds	WL	OPEN

RECOMMENDED CANDIDATES WHO DECLINED THE AWARD OFFERS

BELLINGER, Michelle	C. Y. Lee	RL
PERSON, James	J. F. Paulson	PL
ROMAINE, Suzanne	D. T. Hayes	RL

RECOMMENDED CANDIDATE FOR WHICH NO FUNDING WAS AVAILABLE

DAS, Bigyani	F. A. Allahdadi	PL
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PART IV

ASSOCIATES WHOSE TENURE TERMINATED DURING THE REPORTING PERIOD

BAJPAI, Praphulla K.	AAMRL	June 16, 1989	August 31, 1991
Adviser: Dr. Leon E. Kazarian			
Termination Report received; Adviser's Evaluation received			
BOND, Zinny S.	AAMRL	December 3, 1990	April 2, 1991
Adviser: Dr. Thomas J. Moore			
Termination Report received; Adviser's Evaluation <u>overdue</u>			
BROWN, Clifford E.	AAMRL	June 11, 1990	September 10, 1991
Adviser: Dr. Kenneth R. Boff			
Termination Report received; Adviser's Evaluation received			
CARPER, William R.	FJSRL	May 16, 1989	August 19, 1991
Adviser: Dr. John S. Wilkes			
Termination Report received; Adviser's Evaluation <u>overdue</u>			
CAUZZI, Gianna	AFGL	May 14, 1990	October 31, 1991
Adviser: Dr. Stephen L. Keil			
Termination Report received; Adviser's Evaluation <u>overdue</u>			
CHUNG, Donald D.	WRDC	October 1, 1990	September 30, 1991
Adviser: Dr. Patrick M. Hemenger			
Termination Report received; Adviser's Evaluation <u>overdue</u>			
DELUCIA, Patricia R.	AAMRL	November 1, 1989	August 30, 1991
Adviser: Dr. Rik Warren			
Termination Report received; Adviser's Evaluation <u>overdue</u>			
EGELAND, Alv	GL	January 8, 1991	July 7, 1991
Adviser: Dr. Edward J. Weber			
Termination Report <u>overdue</u> ; Adviser's Evaluation <u>overdue</u>			
GRIFFITHS, Trevor R.	FJSR	July 2, 1990	September 13, 1991
Adviser: Dr. John S. Wilkes			
Termination Report received; Adviser's Evaluation <u>overdue</u>			

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GUNASEKERA, Jay S. WRDC August 1, 1990 June 30, 1991
Adviser: Dr. Harold L. Gegel
Termination Report overdue; Adviser's Evaluation overdue

NOYES, James L. WRDC September 24, 1990 June 23, 1991
Adviser: Dr. Louis A. Tamburino
Termination Report received; Adviser's Evaluation received

PERRY, Clive H. AFRADC May 1, 1990 September 20, 1991
Adviser: Dr. Richard A. Soref
Termination Report overdue; Adviser's Evaluation overdue

REDDY, Katta V. AFAPPL October 2, 1989 October 1, 1991
Adviser: Dr. William M. Roquemore
Termination Report received; Adviser's Evaluation received

SMALDONE, Luigi A. AFGL November 1, 1990 October 31, 1991
Adviser: Dr. Stephen L. Keil
Termination Report received; Adviser's Evaluation overdue

WEINSTEIN, Lisa F. AFSA January 16, 1990 January 15, 1991
Adviser: Dr. Kent K. Gillingham
Termination Report overdue; Adviser's Evaluation overdue

ASSOCIATES ON TENURE AS OF JANUARY 1, 1992

ARMAN, Moe J. PL October 21, 1991 October 20, 1992
Adviser: Dr. Kyle J. Hendricks

BADRI NARAYANAN, Musiri WL March 11, 1991 March 10, 1993
Adviser: Dr. Richard B. Rivir

BEER, Jeremy M. AL November 1, 1991 October 31, 1992
Adviser: Dr. Rick Warren

BLACK, Graham WL February 25, 1991 February 28, 1992
Adviser: Dr. Laverne A. Schlie

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BRUNO, John G.	AL	July 1, 1991	June 30, 1992
Adviser: Dr. Johnathan L. Kiel			
DAS, Naresh C.	WL	September 10, 1990	September 9, 1992
Renewed for 12 months beginning September 10, 1991			
Adviser: Dr. Vaidya Nathan			
DERION, Toniann	SA	January 2, 1991	January 1, 1992
Adviser: Dr. Andrew A. Pilmanis			
DIXIT, Sharvari A.	HSD	July 24, 1990	September 28, 1992
Renewed for 8 months beginning December 30, 1991			
Adviser: Dr. Valerie J. Shute			
FLEITZ, Paul A.	WRDC	December 17, 1990	December 16, 1992
Renewed for 12 months beginning December 17, 1991			
Adviser: Dr. Walter W. Adams			
FRASER, Brian J.	GL	December 20, 1991	January 3, 1992
Adviser: Dr. Howard J. Singer			
GAGNE, Robert M.	AL	February 4, 1991	June 3, 1992
Adviser: Dr. William C. Howell			
GANNON, Robert L.	AL	October 1, 1991	September 30, 1992
Adviser: Dr. Michael A. Rea			
GUSTAFSON, Susan M.	OLAC	March 28, 1991	March 27, 1992
Adviser: Dr. Daniel D. Konowalow			
HANG, Zhijiang	RL	October 7, 1991	October 6, 1992
Adviser: Dr. Michael N. Alexander			
HANSEN, Thorkild B.	RL	August 23, 1991	August 22, 1992
Adviser: Dr. Arthur D. Yaghjian			
JEONG, Kyu-Man	GL	June 15, 1990	June 14, 1992
Renewed for 12 months beginning June 15, 1991			
Adviser: Dr. Donald E. Hunton			
KASPI, Ron	WL	October 21, 1991	October 20, 1992
Adviser: Dr. Chern I. Huang			

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KAUDERER, Mark H.	RL	October 15, 1991	October 14, 1992
Adviser: Dr. George A. Brost			
KIRKWOOD, Robert K.	GL	September 3, 1991	September 2, 1992
Adviser: Dr. William J. Burke			
KOST, Daniel	FJSRL	September 3, 1991	September 2, 1992
Adviser: Dr. Joseph P. Stewart			
KOZLOWSKI, Gregory	AFAPL	July 3, 1989	July 2, 1992
Renewed for 12 months beginning July 3, 1991			
Adviser: Dr. Charles E. Oberly			
LIRON, Zvi	AL	August 6, 1991	August 5, 1992
Adviser: Dr. James N. McDougal			
LO, Ikai	WRDC	July 24, 1990	July 23, 1992
Renewed for 12 months beginning July 24, 1991			
Adviser: Dr. William C. Mitchel			
MAKHLOUF, Usama B.	GL	January 16, 1990	January 15, 1992
Adviser: Dr. Richard H. Picard			
MATIKAS, KTheodore	WL	October 3, 1991	October 2, 1992
Adviser: Dr. Thomas J. Moran			
MENON, Jyothi	AFML	December 13, 1989	June 12, 1992
Renewed for 6 months beginning December 12, 1991			
Adviser: Dr. Frances H. Froes			
MUDALIAR, Saba	RL	January 4, 1991	January 3, 1992
Adviser: Dr. Rober J. Papa			
NASMAN, Victoria T.	AAMRL	October 15, 1990	October 14, 1992
Renewed for 12 months beginning October 15, 1991			
Adviser: Dr. Glenn F. Wilson			
NEKKANTI, Rama Manohara	AFML	July 1, 1988	January 31, 1991
Adviser: Dr. Dennis Dimiduck			
OLIPHANT, Nevin H.	OLAC	October 21, 1991	October 20, 1992
Adviser: Dr. Daniel D. Konowalow			

PACHTER, Ruth	WL	May 6, 1991	May 5, 1992
Adviser: Dr. Robert L. Crane			
PARIDA, Basant K.	WRDC	January 2, 1990	July 1, 1992
Renewed for 6 months beginning January 2, 1992			
Adviser: Dr. Theodore Nicholas			
PRASAD, Somuri V.	WRDC	January 22, 1990	July 21, 1992
Renewed for 6 months beginning January 22, 1992			
Adviser: Dr. Bobby D. McConnell			
QUAN, Ralph W.	FJSRL	September 16, 1991	September 15, 1992
Adviser: Dr. Steven G. Webb			
RAKOWSKY, Margaret H.	FJSRL	June 21, 1991	June 20, 1992
Adviser: Dr. John S. Wilkes			
RAO, Satish I.	WRDC	April 2, 1990	April 1, 1992
Renewed for 12 months beginning April 2, 1991			
Adviser: Dr. Theodore NIcholas			
ROCKWELL, Benjamin	AL	September 9, 1991	September 8, 1992
Adviser: Dr. Donald N. Farrer			
RAVICHANDRAN, Kakkaveri	AFML	January 18, 1989	January 17, 1991
Adviser: Dr. Theodore Nicholas			
RYDER JR, Daniel F.	RL	June 10, 1991	June 9, 1992
Adviser: Dr. Michael J. Suscavage			
SHAW, Kenneth D.	WL	January 15, 1991	January 14, 1992
Adviser: Dr. Athanatio Gavrielides			
SIM, Soo-Man	WRDC	October 10, 19990	October 9, 1992
Renewed for 12 months beginning October 10, 1991			
Adviser: Dr. Nicholas J. Pagano			
TAVARES, Theodore S.	WL	June 10, 1991	June 9, 1992
Adviser: Dr. Joseph J.S. Shang			

UNGARISH, Moshe	WL	September 30, 1991	September 29, 1992
Adviser: Dr. Charles Y. Lee			
ZAWOROTKO, Michael J.	FJSRL	September 3, 1991	September 2, 1992
Adviser: Dr. John S. Wilkes			

REPORTS

Associates are required to submit a progress report six months after the beginning of tenure. Following is a list of Associates who have submitted a report:

BADRI-NARAYANAN, Musiri	BLACK, Graham
BRUNO, John	DERION, Toniann
ERNST, Susan	FLEITZ, Paul
FRASER, Brian	GAGNE, Robert
LIRON, Zui	MUDALIAR, Saba
NASMAN, Victoria	PACHTER, Ruth
RAKOWSKY, Margaret	RYDER, Daniel
SCALORA, Michael	SHAW, Kenneth
SIM, Soo-Man	SMALDONE, Luigi
TAVARES, Theodore	

Termination Report
Dr. P. K. Bajpai
Senior Research Associate

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SEP 9 1991

ASSOCIATESHIP PROGRAMS

(1) DATE:

August 31, 1991

(2) NAME:

Prabhulla Kumar Bajpai

(3) NAME AND LOCATION OF LABORATORY OR CENTER:

Biodynamics & Biocommunications Division,
Armstrong Laboratory,
Wright-Patterson Air Force Base,
Dayton, Ohio 45433

(4) DATES OF TENURE:

6/16/89-8/31/91.

Returned to University of Dayton for Academic Terms 7/16/90-5/15/91.
Work on NRC-Research project was continued during this period.

(5) TITLE OF RESEARCH PROJECT:

Calcium Phosphate Ceramics for Rebuilding Bone Defects.

(6) RESEARCH ADVISER'S NAME:

Leon E. Kazarian (6/16/89-6/15/91).
Ints Kaleps (6/16/91-8/31/91)

(7) LEAVE FROM A PROFESSIONAL POST:

Professor, Department of Biology,
University of Dayton,
300 College Park, Dayton, OH 45432-2320.
&

Adjunct Professor, Department of Biomedical Engineering,
College of Engineering & Computer Science,
and School of Medicine,
Wright State University,
Dayton, OH 45435

Termination Report
Dr. P. K. Beipai
Senior Research Associate

(8) INTERNATIONAL POST HELD DURING TENURE:

1. Visiting Scientist. University of Leiden, Leiden, & Free University, Amsterdam, The Netherlands. March 23-29, 1990. Sponsor: Free University, Amsterdam.
2. Elected Vice President (1990-1992). Society for Biomaterials and Artificial Organs, India. April 13-14, 1990.
3. Visiting Professor. University of Paris, France. November 25 to December 31, 1990. Sponsor The French Government.

(9) PROGRAMMATIC TRAVEL DURING LEAVE:

16th Annual Meeting of the Society for Biomaterials, Charleston, SC. May 19-23, 1990.

(10) SCIENTIFIC SEMINARS, MEETINGS, AND/OR CONSULTATIONS:

Scientific Seminars:

1. Ceramics: A Novel Device for Sustained Long Term Delivery of Chemicals and Biologicals. Third International Symposium on Ceramics in Medicine, Rose-Hulman, Institute of Technology, Terra Haute, IN., November 18-20, 1990.
2. Drug Delivery via Ceramic Devices. Gordon Conferences on Biomaterials, Plymouth, NH. July 10-14, 1989.
3. Ceramic Drug Delivery Systems. Keynote paper presented at the 4th National Conference on Biomaterials and Artificial Organs April 13-14, 1990, Hyderabad, India.

Meetings:

1. 17th Annual Meeting of the Society for Biomaterials, May 1-5, 1991, Scottsdale, AZ.
2. Third International Symposium on Ceramics in Medicine, Rose-Hulman, Institute of Technology, Terra Haute, IN., November 18-20, 1990.
3. Ninth Annual Southern Bioengineering Conference. November 17-19, 1990. Miami, FL.
4. Sixth Annual Academy of Surgical Research, September 27-30, 1990, Long Beach, CA.

Termination Report
Dr. P. K. Bajpai
Senior Research Associate

SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES:(continued)

6. REGULATION OF PHYSIOLOGICAL FUNCTIONS BY DELIVERY OF DRUGS AND HORMONES FROM CERAMIC IMPLANTS. Universite de Compiegne, Compiegne, France. December 10, 1990.
7. DEVELOPMENT OF CERAMIC DRUG DELIVERY SYSTEMS. Universite de Rouen, Rouen, France., December 7, 1990.
8. RESORBABLE BIOCERAMICS. Faculte de Medecine, Lariboisiere - St. Louis, Universite de Paris, Paris, France. December 6, 1990.
9. CERAMICS: A NOVEL DEVICE FOR SUSTAINED LONG TERM DELIVERY OF CHEMICALS AND BIOLOGICALS. Third International Symposium on Ceramics in Medicine, Terra Haute, IN., November 18-20, 1990.
10. CERAMICS: A NOVEL SYSTEM FOR DRUG DELIVERY. Institute of Dental Research, Walter Reed Army Hospital, Washington, D.C. July 27, 1990.
11. CERAMICS: FOR REBUILDING BONE. Institute of Dental Research, Walter Reed Army Hospital, Washington, D.C. July 27, 1990.
12. A UNIQUE SYSTEM FOR LONG TERM SUSTAINED RELEASE OF DRUGS: CERAMICS. Departments of Pharmacology & Ophthalmology, Allahabad Medical College, Allahabad, India. April 26, 1990.
13. REGULATION OF SPERMATOGENESIS BY SUSTAINED RELEASE OF STEROIDS FROM IMPLANTABLE CERAMIC DELIVERY SYSTEMS. Department of Endocrinology, Post Graduate Institute of Medical Sciences, Chandigarh, India. April 16, 1990.
14. CERAMICS FOR DELIVERING CHEMICALS AND BIOLOGICALS. Department of Biomaterials, Central Leather Research Institute, Madras, India. April 10, 1990.
15. CERAMIC DRUG DELIVERY SYSTEMS. Keynote Address, Fourth Annual Meeting of The Indian Society for Biomaterials and Artificial Organs, Hyderabad, India. April 13-14, 1990.
16. NEW USE OF CERAMICS: DRUG DELIVERY. Department of Biomedical Engineering, Wright State University, Dayton, OH. March 7, 1990.

Termination Report
Dr. P. K. Bajpai
Senior Research Associate

SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES:(continued)

17. **BIOCERAMICS: NEW DEVICES.** Bioengineering Program, School of Engineering, Johns Hopkins University, Baltimore, MD. March 5, 1990.

(12) MEETINGS ATTENDED BY SPECIFIC INVITATION:

1. Ninth Annual Southern Bioengineering Conference. November 17-19, 1990. Miami, FL.
2. Third International Symposium on Ceramics in Medicine, Rose-Hulman, Institute of Technology, Terra Haute, IN., November 18-20, 1990.
3. Sixth Annual Academy of Surgical Research, September 27-30, 1990, Long Beach, CA.
4. Cells and Materials 1991 Meeting (Scanning Microscopy 1991), May 4-9, 1991, Bethesda, MD.
5. 4th National Conference on Biomaterials and Artificial Organs April 13-14, 1990, Hyderabad, India.
6. Southern Biomedical Engineering Conference, Richmond, VA., October 15-16, 1989.
7. Gordon Conferences on Biomaterials, Plymouth, NH. July 10-14, 1989.

(13) TEACHING IF ANY, AS AN ASSOCIATE:

At University of Dayton Fall and Spring Terms of 1990-1991.

Physiology (Biology - 403). Fall Semester.

Physiology (Biology - 404). Spring Semester

Immunology (Biology - 152). Three Lectures, Spring Semester.

**Termination Report
Dr. P. K. Beipai
Senior Research Associate**

TEACHING IF ANY, AS AN ASSOCIATE:(continued)

Supervision of Students:

1. **H. A. BENGHUZZI, Ph.D.** 1990.

Dissertation:

Characterization of Ceramic Drug Delivery Systems and Their Application in Regulating Fertility.

Post-Doctoral Fellow, Dept. of Pathology, University of Michigan, Ann Arbor, Michigan.

2. **H. H. ARAR, M.Sc.** 1990.

Thesis:

Development of Zinc Calcium Phosphorous (ZCAP) Ceramics for Drug Delivery.

MD. Program, The University of Cincinnati, Cincinnati, Ohio.

3. **D. Parker, B.Sc. (Current).**

Thesis:

Effect of Testosterone Delivered Locally by Means of Ceramic Composites on Bone Healing.

HONORS PROGRAM

1. **N. Stricker.**

Thesis: Biocompatibility of Ferric Calcium Phosphorous Oxide (FECAP) Ceramic/Glass

2. **R. Larrabee.**

Thesis: A New Ceramic Composite: Ferric Calcium Phosphate.

Termination Report
Dr. P. K. Bajpai
Senior Research Associate

(14) WORK IN PROGRESS:

The final objective of this award was to develop an injectable ceramic bone substitute composite for repairing anterior wedge vertebral fractures. Data obtained from phase one studies indicated that on an overall, basis calcium phosphate ceramic-cysteine bone substitute composites were superior to ceramic-malic acid composites. In phase two anterior wedge fractures were induced in lumbar vertebrae of six male swine and filled with an injectable ZCAP ceramic-cysteine bone paste. Six male swine were sham operated and six male swine served as non-operated controls. The data obtained through six weeks post surgery shows that ZCAP-cysteine implants had no effect on blood chemistry, hematology values, and mean body weight. Data from the second phase of the swine study is expected by the end of this year. Animals assigned to the 12 week group will be euthanized in October.

(15) SUMMARY OF RESEARCH DURING TENURE:

A two phase study was designed to develop an injectable ceramic composite to bridge an anterior wedge vertebral fracture gap. In phase one, six calcium phosphate ceramic-organic acid composites were prepared from hydroxyapatite, tricalcium phosphate, or zinc calcium phosphate, with malic acid and CaOH₂ or cysteine and used to repair defects in rabbit tibiae. Autografts from right tibiae of three rabbits from each treatment group were implanted in left tibiae. Through 12 weeks post surgery, implants had no effect on blood chemistry and hematology values, mean body weight, and tibial strength (maximum torque). Complete bridging was observed 12 weeks post surgery.

(16) PUBLICATIONS AND PAPERS RESULTING FROM RESEARCH AS AN ASSOCIATE:

1. Parker, D., Lucas, H., Cooper, J.R., Eveland, E.S., and Bajpai, P.K. Calcium Phosphate-Organic Acid Composites for Rebuilding Bone. Tenth Southern Biomedical Engineering Conference, October 18-21, 1991, Atlanta, GA (In Press), 1991
2. Bajpai, P.K. Ceramics: A Novel Device for Sustained Long Term Delivery of Drugs. 3rd International Symposium on Ceramics in Medicine, November 19-20, 1990. Rose-Hulman Institute of Technology Terra Haute, IN. (In press), 1991

Termination Report
Dr. P. K. Bajpai
Senior Research Associate

PUBLICATIONS AND PAPERS RESULTING FROM RESEARCH AS AN ASSOCIATE:
(continued)

3. **Bajpai, P.K.** Ceramic-Polyfunctional Carboxylic Acid Composites for Reconstructive Surgery of Hard Tissues. In: Blood Compatible Materials and Devices : Perspectives Toward 21st Century. M. Szycher and C.P.Sharma (editors). Technomic Publishing Co., Lancaster, PA, New York, NY. Chapter 17, pp. 289-303, 1990.
4. **Bajpai, P.K.** Ceramic Amino Acid Composites for Repairing Traumatized Hard Tissues. Handbook of Bioactive Ceramics, Vol II: Calcium Phosphate and Hydroxylapatite Ceramics. T. Yamamuro, L.L. Hench, J. Wilson-Hench, (editors). CRC Press, Baton Raton, FL. pp. 255-270, 1990.
5. Eveland, E.S., T. Mayer, J. Maslanka, and **P.K. Bajpai**. Alkaline Tricalcium Phosphate-Polyfunctional Acid Composites for Repairing Traumatized Bone. In: Digest of Papers, Eighth Southern Biomedical Engineering Conference. Richmond, VA. October 15-16, 1989. Medical College of Virginia, Continuing Education in Medicine & Allied Health, Richmond, VA. W.A. Krause (editor), pp. 193-198, 1989.

Abstracts:

1. Eveland, E.S., Cooper, J.R., Parker, D., **Bajpai, P.K.**, and D.R. Mattie. Calcium Phosphate Ceramic Organic Acid Composite Bone Substitutes. Journal of Investigative Surgery (Abstract No.84), 4: 409, 1991.
2. Eveland, E.S., J.R. Cooper, D.A. Palomino, and **P.K. Bajpai**. Calcium Phosphate Ceramic Malic Acid Composite Bone Substitute. Journal of Investigative Surgery (Abstract No.11), 3: 297, 1990.
3. Eveland, E.S., J.R. Cooper, D.A. Palomino, and **P.K. Bajpai**. Calcium Phosphate Ceramic Cysteine Composite Bone Substitutes. Journal of Investigative Surgery (Abstract No.12), 3: 297, 1990.
4. **Bajpai, P.K.** Alkaline Tricalcium Phosphate-Polyfunctional Acid Composites for Repairing Traumatized Bone. (Abstract). Biomat. Art. Cells, Art. Org., 17 (4), 460, (1989).

Termination Report
Dr. P. K. Bajpai
Senior Research Associate

(17) PATENTS APPLIED FOR AS A RESULT OF RESEARCH AS AN ASSOCIATE:
N/A

(18) FUTURE POSITION AND ADDRESS OR CURRENT FORWARDING ADDRESS:

Dr. Praphulla K. Bajpai,
Professor,
Department of Biology,
University of Dayton,
300 College Park,
Dayton, OH 45469-2320.

(19) HONORS AND AWARDS:

1990-C. William Hall Research Award for distinguished contributions to Biomedical Engineering, presented by the Southern Biomedical Engineering Conference, Miami, FL., November 18, 1990.

Sessions Chaired at Meetings:

1. Chaired Session on **Drug Delivery and Immobilization**. 17th Annual Meeting of the Society for Biomaterials, Scottsdale, AZ. May 1-5, 1991.
2. Chaired Session on **Orthopaedics**. Sixth Annual Academy of Surgical Research, Long Beach, CA September 27-30, 1990.
3. Chaired Session on **Drug Release Materials**. 16th Annual Meeting of the Society for Biomaterials, Charleston, SC. May 19-23, 1990.
4. Chaired Session on **Sustained Drug Release Systems**. 4th Annual Meeting of the Society for Biomaterials and Artificial Organs India, Hyderabad, AP., India. April 13-14, 1990.
5. Chaired Session on **Biomaterials**. Southern Biomedical Engineering Conference, Richmond, VA., October 18-16, 1989.

**NATIONAL RESEARCH COUNCIL
RESEARCH ASSOCIATESHIP PROGRAM
TERMINATION REPORT**

(1) DATE

23 Aug 1991

RECEIVED

(2) NAME

Clifford E. Brown

AUG 26 1991
ASSOCIATESHIP PROGRAMS

(3) LOCATION OF TENURE

Armstrong Laboratory
Crew Systems Directorate
Human Engineering Division
Design Technology Branch - AL/CFHD
Wright-Patterson Air Force Base, OH 45433-6573

(4) DATES OF TENURE

11 June 1990 to 11 Sept 1991

(5) TITLE OF RESEARCH PROJECT

A Social Psychological Perspective for Aiding System Designers

(6) RESEARCH ADVISER'S NAME

Kenneth R. Boff

(7) ON LEAVE FROM PROFESSIONAL POST

Associate Professor of Psychology
Department of Psychology
Wittenberg University
P. O. Box 720
Springfield, OH 45501

(8) INTERNATIONAL POSTS HELD DURING TENURE

N/A

(9) PROGRAMMATIC TRAVEL DURING TENURE

4-5	Sep 1990	Urbana, IL Site Visit University of Illinois Neville Moray Department of Industrial Engineering Christopher Wickens and Alan Stokes Aviation Research Laboratory	1
26	Nov 1990	Ann Arbor, MI University of Michigan Judith Olson and Gary Olson Cognitive Science and Machine Intelligence Laboratory	1
19-20	Aug 1991	Norcross, GA Attended Computer-Aided Systems Human Engineering (CASHE) Program Review Search Technology	1

1 = Support provided by AL/CFHD

(10) SCIENTIFIC SEMINARS, MEETINGS, AND/OR CONSULTATIONS

25-29	Jun 1990	Dayton, OH Attended Workshop Human Factors: Case Studies and Applications in Engineering Design	1
9-12	Aug 1990	Boston, MA Attended Conference and Presented Papers American Psychological Association	2
10-11	Sep 1990	Dayton, OH Attended Conference 3rd DOD Training Technology Technical Group Meeting	3
8-12	Oct 1990	Orlando, FL Attended Conference and Presented Papers Human Factors Society - 34th Annual Meeting	4
1	May 1991	Columbus, OH Attended Conference and Presented Paper Sixth International Symposium of Aviation Psychology	2

TERMINATION REPORT

1. Date: 27 May, 1991
2. Name: Z. S. Bond
3. Laboratory: Armstrong Aerospace Medical Research Laboratory,
Wright-Patterson AFB, Ohio
4. Dates: December, 1990 to April, 1991
5. Research project: Native and non-native speech understanding in
difficult listening conditions.
6. Adviser's name: Thomas J. Moore
7. Leave from: Department of Linguistics
Ohio University
Athens, OH 45701
8. na
9. na
10. none
11. none
12. na
13. na

Pt C tive,

JUN 1 1991

ASSOCIATESHIP PROGRAM

14. Work in progress:

The associateship period gave me an opportunity to develop materials for the experiments, to run subjects, and to do preliminary data analysis. Currently, we are engaged in statistical analysis of subject responses in preparation for anticipated publication.

We intend to prepare three reports 1) describing the results of intelligibility testing 2) comparing the response modes used in evaluating sentence comprehension, and 3) describing acoustic-phonetic structures of words produced by highly intelligible vs. less intelligible speakers.

15. Research during tenure:

The research began during tenure dealt with speech perception and understanding abilities of native English listeners in comparison with listeners for whom English is a second language, when faced with difficult listening conditions and a variety of speakers.

The materials consisted of a standard intelligibility test (Modified Rhyme Test) and sentences designed for intelligibility testing. Five speakers recorded all the materials. Listeners were tested in six listening conditions investigating signal to noise ratios and band-pass filtering. The MRT was administered in a closed-set response format. The sentence test was administered in an open-set written format and spoken format. Ten native and ten non-native listeners participated in each listening condition.

Non-native listeners experiences substantial decrements in performance when listening to words or sentences in noise. Written responses were more difficult than spoken responses. The results suggest that non-native listener limited capacity is overtaxed by the requirement of separating speech from noise.

16. Publications are expected in the future.

17. na

18. Current address: Department of Linguistics, Ohio University

/ LP/171

FINAL REPORT

RECEIVED

AUG 11 1991

ASSISTANT PROFESSOR

(1) Date: 19 Aug 91

(2) Name: William Robert Carper

(3) Name and Location of Laboratory:

Frank J. Seiler Research Laboratory
USAF Academy
CO 80840-6528

(4) Dates of Tenure: 16 May - 31 Aug 89
 16 December 89 - 31 Aug 90
 20 May 91 - 19 Aug 91

(5) Title of Research Project: NMR Studies of Room Temperature Melts

(6) Research Advisor's Name: Dr John S. Wilkes

(7) On leave from: Professor of Chemistry
 Department of Chemistry
 Wichita State University
 Wichita, Kansas 67208

(8) International Posts Held: None.

(9) Professional Travel During Tenure:

- a. NMR Workshop and Meeting at Univ of Florida, Gainesville, FL, 5-9 Mar 90
- b. 31st Annual Experimental NMR Conference, Asilomar, CA, 1-5 Apr 90
- c. American Chemical Society National Meeting, Washington DC, 24-30 Aug 90
- d. Gordon Conference on Molten Salts and Liquid Metals, Tilton NH, 5-9 Aug 91,

(10) Programmatic Travel: None

(11) Seminars or Lectures Delivered:

- a. University of the Pacific, Stockton CA, 6 Apr 90, "NMR Relaxation Studies"
- b. 1990 CIC Congress, Halifax, Nova Scotia, 15-20 Jul 90, "Ion-Ion Interactions in Room Temperature Chloroaluminate Ionic Liquids", presented by J.S. Wilkes

- c. 1990 ACS Southeast-Southwest Regional Meeting, New Orleans, 5-7 Dec 90, "NMR Relaxation Studies in Ambient Temperature Chloroaluminate Ionic Liquids" Symposium on Electrochemical and Spectroscopic Studies in Non-aqueous Solvents - presented by J.S. Wilkes.

(12) Meetings Attended by Invitation: None

(13) Teaching: None

(14) Work in Progress:

Recent ^{13}C and ^{27}Al NMR and viscosity studies in this laboratory indicate that AlCl_4^- in the MEI-chloroaluminate melts forms a complex by interacting with the C-2, C-4 and C-5 hydrogens on the MEI $^+$ ring. Multiple spin probe studies (MSP) of ^{27}Al and ^{23}Na vs. ^{13}C relaxation rates give similar relationships, thus establishing the existence of multi-ion complexes in the melts. A new series of MEICl-AlCl₃-EtAlCl₂ melts provides verification of the MSP method as the ^{13}C NMR from two separate parts of the resulting complex correlate with the ^{27}Al quadrupolar relaxation results in each melt. Initial NMR studies have identified the existence of the complex species, EtAl₂Cl₆ $^-$. In this and similar cases, it is possible to determine the ^{27}Al quadrupolar coupling constant for the Al complexes in the liquid state.

(15) Summary of Research During Tenure:

This research has focused on the use of high and low field Nuclear Magnetic Resonance to study the composition of room temperature molten salts. We have used carbon, aluminum and sodium NMR results to establish changes in ionic complexes as function of temperature and melt composition. NMR NOE and relaxation data have been combined with diffusion and viscosity measurements to establish the relative size and composition of ionic liquid complexes. We have determined nuclear quadrupolar coupling constants for the various complexes in the liquid state.

(16) Publications Resulting from Research as an Associate: (copies attached)

- (a) ^{13}C NMR and Viscosity Studies of Ionic Structure in 1-methyl-3-ethylimidazolium Chloride-AlCl₃, Molten Salts, W.R. Carper, J.L. Pflug, A.M. Elias and J.S. Wilkes, *J. Phys. Chem.* (submitted)
- (b) Dual Spin Probe NMR Relaxation and Viscosity Studies of Ionic Structure in 1-methyl-3-ethylimidazolium Chloride-AlCl₃, Molten Salts, W.R. Carper, J.L. Pflug and J.S. Wilkes, *Inorg. Chem.* (submitted)
- (c) Multiple Spin Probe NMR and Viscosity Studies of Ionic Structure in 1-methyl-3-ethylimidazolium Chloride-AlCl₃, Molten Salts, W.R. Carper, J.L. Pflug and J.S. Wilkes, *Inorganica Chimica Acta* (submitted)
- (d) The Hydrolysis of 1,5-Gluconolactone: Semi-Empirical Methods and Carbon-13 NMR Confirmation, B.S. Combs, W.R. Carper and J.J.P. Stewart, THEOCHEM (submitted)

Demonstration

Boff, K. R., Monk, D. L., Swierenga, S. J., Brown, C. E., & Cody, W. J. (1991).
Computer-aided systems human engineering: A hypermedia tool. Demonstration to be
presented at the Human Factors Society - 35th Annual Meeting, San Francisco, CA,
September 6, 1991.

(17) PATENTS APPLIED FOR AS A RESULT OF RESEARCH

N/A

(18) FUTURE POSITION AND ADDRESS

Professor of Psychology
Department of Psychology
Wittenberg University
P. O. Box 720
Springfield, OH 45501

(16) PUBLICATIONS AND PAPERS RESULTING FROM RESEARCH

Publications

Boff, K. R., Monk, D. L., Swierenga, S. J., Brown, C. E., & Cody, W. J. (1991, in press). Computer-aided human factors for system designers. *Proceedings of the Human Factors Society 35th Annual Meeting*.

Brown, C. E., Boff, K. R., & Swierenga, S. J. (1991, in press). Cockpit resource management: A social psychological perspective. *Proceedings of the Sixth International Symposium on Aviation Psychology*.

Brown, C. E., Swierenga, S. J., & Wellens, A. R. (1991). Social psychological metaphors for human-computer system design. *Proceedings of the 44th National Aerospace and Electronics Conference*, 2, 793-799.

Paper Presentations

Boff, K. R., Monk, D. L., Swierenga, S. J., Brown, C. E., & Cody, W. J. (1991). Computer-aided human factors for system designers. Paper to be presented at the Human Factors Society - 35th Annual Meeting, San Francisco, CA, September 4, 1991.

Brown, C. E., Swierenga, S. J., & Wellens, A. R. Social psychological metaphors for human-computer system design. 44th National Aerospace and Electronics Conference, Dayton, Ohio, May 21, 1991.

Brown, C. E., Boff, K. R., & Swierenga, S. J. Cockpit resource management: A social psychological perspective. Sixth International Symposium on Aviation Psychology, Columbus, Ohio, May 1, 1991.

Brown, C.E., Swierenga, S. J., & Wellens, A. R. Human compute "friendship": A metaphor for intelligent system design. Human Factors Society - 34th Annual Meeting, Orlando, Florida, October 11, 1990.

Wellens, A. R., Grant, B., & Brown, C. E. Effects of time stress upon human and machine operators of a simulated emergency response system, Human Factors Society, Orlando, Florida, October 10, 1990.

Brown, C. E., McBride, D. J., McNeese, M. D., Wellens, A. R., & Mayrand, C. Enhancing team performance with the Team Resource Allocation Problem (TRAP). American Psychological Association, Boston, Massachusetts, August 10, 1990.

Wellens, A. R., Brown, C. E., McGovern, C. E., & Mayrand, C. Effects of "electronic propinquity" on perceptions of human-computer teamwork. American Psychological Association, Boston, Massachusetts, August 11, 1990.

21	May 1991	Dayton, OH Attended Conference and Presented Paper 44th National Aerospace and Electronics Conference	3
2-6	Sep 1991	San Francisco, CA Attended Conference and Co-authored Paper and Demonstration Human Factors Society - 35th Annual Meeting	4

- 1 = Support provided by AL/CFHD
 2 = Support provided by Wittenberg University
 3 = No Cost
 4 = Support provided by National Research Council

(11) SEMINARS/LECTURES DELIVERED AT UNIVERSITIES/INSTITUTES

N/A

(12) MEETINGS ATTENDED BY SPECIFIC INVITATION

N/A

(13) TEACHING AS AN ASSOCIATE

N/A

(14) WORK IN PROGRESS

I am currently working on a "Multidisciplinary Communication Concept" which facilitates the integration of human factors information into the system design process. Design team members with different perspectives and backgrounds must be provided with tools (e.g., computer aids) to more easily understand and communicate the relevance and applicability of ergonomics information to their system design problems. Methods are needed for extracting specific experiential demonstrations of human perception and performance capabilities and limitations from existing data sources so that they may be shared with design team members. Common experiences can help bridge the multidisciplinary communication gap and assure that human factors information is given full consideration in the design process.

(15) SUMMARY OF RESEARCH DURING TENURE

My research as an Associate focused on several overlapping areas. These areas included the system design process, human factors information in system design, human-computer interaction, computer-supported cooperative work, and multidisciplinary communication. I applied a social psychological perspective to human-computer interaction and examined ways computers could aid the system design team in incorporating human factors information into the design process. Computers can not only provide designers with information about human capabilities and limitations, they can also help designers actually experience human factors phenomena and communicate the relevance of such phenomena to fellow design team members.

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TERMINATION REPORT

OCT 28 1991

ASSOCIATESHIP PROGRAMS

Date: Sunspot, October 22, 1991

Name of the Resident Research Associate: Luigi Antonio Smaldone.

Location of Tenure: AFSC/Geophysics Laboratory, Sunspot, NM.

Dates of Tenure: From November 1, 1990 to October 31, 1991.

Title of Research Project:

Relations between photospheric velocity fields and magnetic field configurations in solar active regions.

Research Adviser's Name: Dr. Stephen L. Keil.

Are you on Leave from a Professional Post? Yes

Associate Professor

Dipartimento di Scienze Fisiche
Università degli Studi di Napoli
Mostra d' Oltremare, Pad. 19
I-80125 NAPOLI, Italy

International Posts Held during Tenure: N/A.

Programmatic Travel during Tenure: N/A.

Scientific Meetings during Tenure:

- (1) New Mexico Astronomy Symposium, Socorro, New Mexico, November 30, 1990.
- (2) National Solar Observatory Staff Meeting, Tucson, Arizona, January 10-11, 1991
- (3) Meeting of Solar Physics Division of AAS, Huntsville, Alabama, April 9-11, 1991.
- (4) National Solar Observatory Staff Meeting, Sunspot, New Mexico, September 16-18, 1991.
- (5) (Fall Meeting of American Geophysical Union, San Francisco, California, December 9-13, 1991.)

Seminars or Lectures Delivered at Universities and/or Institutes:

at National Solar Observatory, Sunspot, NM 88349

Title of Lecture: Observations of Low Temperature Components of Solar Flares
October 8, 1991.

Meetings attended by specific invitation: N/A.

Teaching as an Associate: N/A.

Work in Progress:

The observations performed during this year produced a huge data amount (of the order of 10 Gigabytes). The last observing run is still in progress. The analysis of one selected good temporal series is just started; it will take about one year to be accomplished.

Termination Report

RECEIVED

SEP 16 1991

ASSOCIATESHIP PROGRAMS

- (1) DATE: September 13, 1991.
- (2) NAME: Katta Viswanath Reddy
- (3) LOCATION OF TENURE: Aero Propulsion Laboratory,
Wright-Patterson Air Force Base,
Dayton, OH 45433-6563.
- (4) DATES OF TENURE: Oct. 2, 1989 through Oct. 1, 1991.
- (5) TITLE OF RESEARCH PROJECT:
"Fundamental Studies on Deposit Formation in Thermally and Fluid Mechanically
Stressed Fuels"
- (6) RESEARCH ADVISER'S NAME: Dr. W. M. Roquemore
- (7) ARE YOU ON LEAVE FROM
A PROFESSIONAL POST: No
- (8) INTERNATIONAL POSTS
HELD DURING TENURE: None
- (9) PROGRAMMATIC TRAVEL
DURING TENURE: No
- (10) SCIENTIFIC SEMINARS, MEETINGS, AND/OR CONSULTATIONS:
(i) Reno, Nevada, between Jan. 11 and Jan. 15, 1990
(ii) Washington, D.C. between Aug. 26 and Aug. 31, 1990
- (11) SEMINARS OR LECTURES
DELIVERED AT UNIVERSITIES
AND/OR INSTITUTES: Nil
- (12) MEETINGS ATTENDED BY
SPECIFIC INVITATION: None
- (13) TEACHING, IF ANY,
AS AN ASSOCIATE: N/A
- (14) WORK IN PROGRESS:
The mathematical model developed is behaving satisfactorily for a particular type
(constant heat-flux) of heated tube experiments. Recently, an experimental rig
"PHOENIX" has become operational at Aero Propulsion Laboratory to study the fuel
thermal stability in a more controlled way. Preliminary calculations for this rig indicate
that the current model needs to be improved based on the vast additional data coming
out of these experiments. Work is in progress towards a second generation
mathematical model for the deposition of aircraft fuels.

(15) SUMMARY OF RESEARCH DURING TENURE:

A time-dependent Computational Fluid Dynamics and Chemistry (CFDC) model has been developed to study the deposition process in the heated tubes over long duration of times. An iterative boundary technique has been developed to account for the heat transfer losses in the tube wall and the deposit itself as the deposit builds up on the tube walls. A chemistry model consists of three global bulk fuel reactions and three wall reactions has been proposed. A mathematical model for the inhibition phenomenon is also proposed. The full Navier-Stokes equations along with k-e turbulent and chemical species equations have been numerically solved using an implicit scheme.

(16) PUBLICATIONS AND PAPERS RESULTING FROM RESEARCH AS AN ASSOCIATE:

- (i) K. V. Reddy and W. M. Roquemore; A Time-Dependent Model with Global Chemistry for Decomposition and Deposition of Aircraft Fuels, Preprints of the Symposium on the Stability and Oxidation Chemistry of Middle Distillate Fuels, ACS Meeting, Washington, D.C., Aug. 26-31, 1990.
- (ii) K. V. Reddy and W. M. Roquemore; A Numerical Method for Simulating the Fluid-Dynamic and Heat-Transfer Changes in a Jet Engine Injector Feed-Arm due to Fouling, AIAA Paper 92-0768, to be presented at the 30th Aerospace Sciences Meeting and Exhibit, Reno, Nevada, Jan. 6-9, 1992.

(17) PATENTS APPLIED FOR AS A
RESULT OF RESEARCH AS AN
ASSOCIATE: Nil

(18) FUTURE POSITION AND ADDRESS OR CURRENT FORWARDING ADDRESS:

Chemist at Systems Research Laboratories, Inc., Dayton, Ohio.
Residence: 1084 Cambridge Sta., Apt. D, Centerville, OH 45458.

NRC Termination Report

RECEIVED

- (1) DATE 30 May 1991. JUN 1 1991
- (2) YOUR NAME James L. Noyes. ASSOCIATESHIP PROGRAMS
- (3) LOCATION OF TENURE Wright Laboratories, Avionics Directorate, Dayton, Ohio, AFSC/WL/AAAT-1.
- (4) DATES OF TENURE 24 Sep 90 - 24 Jun 91 (9-Month Program).
- (5) TITLE OF RESEARCH PROJECT Neural Network Optimization.
- (6) RESEARCH ADVISOR'S NAME Dr. Louis Tamburino.
- (7) ARE YOU ON LEAVE FROM A PROFESSIONAL POST? Yes.
Sabbatical Leave as Associate Professor of Computer Science,
Department of Mathematics and Computer Science,
Wittenberg University, Springfield, Ohio, 45501.
- (8) INTERNATIONAL POSTS HELD DURING TENURE N/A
- (9) PROGRAMMATIC TRAVEL DURING TENURE None. All communication was accomplished using electronic messages (technical correspondence, computer code), telephone and FAX services.
- (10) SCIENTIFIC SEMINARS, MEETINGS, AND/OR CONSULTATIONS
Presented Interim Research Status Briefing to AAAT,
Wright Laboratories, 31 Jan 91.
Presented Neural Network Seminar at Dayton Engineers Club,
"Introduction to Neural Networks and their Application,"
Dayton Ohio, 26 Mar 91.
Will present Final Status Briefing to AAAT, Wright Laboratories, Jun 91.
- (11) SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES
Presented Paper to Fourth Conference on Neural Networks and Parallel Distributed Processing at Indiana-Purdue University, "Neural Network Optimization Methods," Fort Wayne, Indiana, 12 Apr 91.
- (12) MEETINGS ATTENDED BY SPECIFIC INVITATION
Presentation by Robert Hecht-Nielsen on a new Information Retrieval System using Neural Network technology, Dayton Ohio, 8 Apr 91.
- (13) TEACHING, IF ANY, AS AN ASSOCIATE Only providing my Backpropagation code to the AAAT-1 Group Leader and showing one of the group something about the code and the theory.

- (14) WORK IN PROGRESS The 30-page draft report to AAAT is complete and under review by Dr. Tamburino. The OPTNET computer program code (over 1600 lines) is complete and in-code documentation is being added. This will be turned over to Dr. Tamburino. A final briefing to AAAT is currently in preparation.
- (15) SUMMARY OF RESEARCH DURING TENURE It was shown that multi-layer feed-forward neural networks could be modeled as unconstrained minimization problems (limits on the weights or biases yield constrained problems). Because of this, standard optimization methods and software can be used to solve these neural network problems using far fewer iterations than any Backpropagation methods. In particular, superlinearly convergent gradient methods can be used. While Conjugate Gradient techniques showed promise, a new low-storage Quasi-Newton method was discovered which provided superior results for all of the problems tested. An OPTNET prototype program implemented in Pascal was interfaced with standard optimization codes, including the Nocedal L-BFGS FORTRAN code, to accomplish this.
- (16) PUBLICATIONS AND PAPERS RESULTING FROM RESEARCH AS AN ASSOCIATE
James L. Noyes, "Neural Network Optimization Methods," Proceedings of the Fourth Conference on Neural Networks and Parallel Distributed Processing, Indiana University-Purdue University, Fort Wayne, Indiana, April 11-13, 1991.
- (17) PATENTS APPLIED FOR AS A RESULT OF RESEARCH AS AN ASSOCIATE
N/A.
- (18) FUTURE POSITION AND ADDRESS OR CURRENT FORWARDING ADDRESS
Department of Mathematics and Computer Science
Wittenberg University
Box 720, Springfield, OH 45501.

- (f) Effect of temperature upon hypersensitive transitions in lanthanides: Experimental techniques and preliminary results for the $^4I_{9/2} \rightarrow ^4G_{5/2}$ transition of NdCl₃³⁻ in chloride melts between ambient and 650°C
Trevor R. Griffiths and Nicolas J. Phillips, Journal of Less Common Metals, 1991, in press.
(This article describes a combination of experimental work performed during tenure and just previously at the University of Leeds. It was written while on tenure, has been accepted for publication, and is currently at the printers).
- (g) A new machined glass-ceramic crucible for definitive thin film hot corrosion studies: Testing, evaluation and preliminary results
Trevor R. Griffiths and Nicolas J. Phillips, submitted to Materials at High Temperatures.
(This article was written while on tenure).
- (h) Optical absorption spectroscopy of thorium dioxide: An analysis of oxidising and reducing anneals and gamma and uv radiation on both flux-grown and arc-fused single crystals
Trevor R. Griffiths and James Dixon, Journal of the Chemical Society, Faraday Transactions, submitted for publication.
(This article was written while on tenure).
- (17) N/A.
- (18) School of Chemistry, The University of Leeds, LEEDS LS2 9JT, West Yorkshire, UK.

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TERMINATION REPORT

NOV 11 1991

- (1) 17 October 1991. (2) 17 October 1991 ASSOCIATESHIP PROGRAMS
(2) Dr Trevor R. Griffiths (4) Dr Trevor R. Griffiths
- (3) Frank J. Seiler Research Laboratory, US Air Force Academy, Colorado Springs, Colorado, 80840.
- (4) 3 July 1990 - 25 September 1990 and 31 December 1990 - 9 September 1991.
- (5) Spectroscopic studies in room temperature chloroaluminate melts.
- (6) Dr John S. Wilkes.
- (7) Senior Lecturer, on leave from the School of Chemistry, The University of Leeds, LEEDS LS2 9JT, UK.
- (8) N/A.
- (9) Chicago: 2 March 1991 - 8 March 1991.
Tilton, New Hampshire: 3 August 1991 - 9 August 1991.
- (10) (a) PITTCON 91, Conference on Analytical Chemistry and Applied Spectroscopy, Chicago, 3-8 March 1991.
(b) 33rd Rocky Mountain Conference on Analytical Chemistry, Denver, CO, 29-30 July 1991. Also presented a Poster.
(c) Gordon Conference on Molten Salts and Liquid Metals, Tilton School, Tilton, NH, 5-9 August 1991.
(d) Total Quality Manager Seminar, US Air Force Academy, CO, 1-2 April 1991.
(e) Design of Experiments, DOEC, US Air Force Academy, CO, 20-23 May 1991.
(f) Various seminars given by colleagues and visitors to Frank J. Seiler Research Laboratory, US Air Force Academy, CO. (about 10 in total).
- (11) (a) Frank J. Seiler Research Laboratory, US Air Force Academy, Colorado Springs, CO, 26 February 1991
Title:- Studying hot corrosion with EASE: recent results.
(b) Chemistry Department, Wichita State University, Wichita, Kansas, 28 February 1991
Title:- Studying hot corrosion with EASE: recent results.
- (c) Chemistry Department, Michigan State University, East Lansing, Michigan, 11 March 1991
Title:- Some interesting uses of fiber-optic spectroscopy.
- (12) None.
- (13) None.
- (14) During my tenure, besides learning to work with room temperature melts, I also made some measurements on the EDAX SEM instrument. This data will be worked up, and hopefully will contribute to data already obtained in Leeds so that the work can be written up for publication. Colleagues at the Seiler Lab have agreed to furnish me with additional details, if necessary, from the SEM studies, and to record some more spectra for me in room temperature melts on the recently arrived spectrophotometer (see 19 B.(a)). I have two incomplete manuscripts, which I had hoped to have completed before the end of my tenure, but did not do so, partly for the reasons outlined in 19 B.(a) and (c). I now plan to make the necessary measurements in Leeds, and complete them, with due acknowledgements. I

I am currently making a research grant application with an NRC Associate, with whom I also overlapped in tenure, Prof. A.M. Elias (University of Lisbon), to the British Council for spectroelectrochemistry studies of a variety of room temperature melts, to determine their suitability as electrolytes for high power batteries.

I am also making a NATO Research Grant application with Prof. W.R. Carper (Wichita State University), another NRC Senior Associate with whom I also overlapped, to extend my spectroscopic studies in high and low temperature melts with his work on nmr, including examining the same solutions of suitable nuclei in room temperature melts by the two difference techniques. The objective is to be able to extrapolate the information unique to nmr studies to high temperature molten salt systems, which cannot be studied *in situ* by nmr spectroscopy, but can be using optical fibers linked to a uv-visible near ir spectrophotometer (see next section).

(15)

Summary of research during tenure:

Visible absorption spectra of f-f transitions of hexachloro lanthanide complexes of neodymium, samarium and praseodymium were studied in the room temperature melt MEIC (1-methyl-3-ethylimidazolium chloride)-AlCl₃ up to 100°C. When extrapolated and compared with earlier spectra in LiCl-KCl (450-650°C) trends matched. Room temperature spectra are narrower and thus more informative. The temperature dependence found for certain discrete bands will help resolve particular theoretical problems in lanthanide spectra. Further spectroscopic and temperature-dependent nmr studies in ambient melts can thus be applied to the interpretation of high temperature (including industrial) molten salt phenomena.

- (16) (a) Tetrahalogenomercury(II) complexes: A study of their electronic spectra and formation constants, and ionic strength and cation effects
Trevor R. Griffiths and Richard A. Anderson, Canadian Journal of Chemistry, 1991, Vol.69, pp.451-457.
(This article was finalised while on tenure).
- (b) Electronic spectra, formation constants and geometries of HgX₃⁻ in methanol
Trevor R. Griffiths and Richard A. Anderson, Inorganic Chemistry, 1991, Vol.30, pp.1912-1918.
(This article was finalised while on tenure).
- (c) The determination of Soret coefficients in molten salts using fiber-optic spectroscopy
Trevor R. Griffiths and Nicolas J. Phillips, Journal of the Electrochemical Society, 1991, Vol.138, pp.3575-3581.
(This article was written and finalised while on tenure).
- (d) Electronic spectra of anionic mixed halide complexes in solution: Identification, computation of spectra and stability constants, and assignment of transitions of [HgX₂Y]⁻ and [HgX₂Y]²⁻
Trevor R. Griffiths and Richard A. Anderson, Journal of the Chemical Society, Faraday Transactions, 1991, Vol.87, pp.1697-1705.
(This article was written and finalised while on tenure).
- (e) Absorption spectrum of single crystal UO₂: Identification of and effect of temperature on the peak positions of essentially all optical transitions in the visible to near infrared regions using derivative spectroscopy
Trevor R. Griffiths and Hugh V. St.A. Hubbard, Journal of Nuclear Materials, 1991, Vol.185, pp.243-259.
(This article was written and finalised while on tenure).

DeLucia, P. R. (1991). Pictorial and motion-based information for depth perception. Journal of Experimental Psychology: Human Perception and Performance, 17, August.

DeLucia, P. R. & Hochberg, J. (1991). Geometrical illusions in solid objects under unimpoverished viewing conditions. Under review.

(17) Patents applied for as an associate: None.

(18) Future position and address: Assistant Professor of Psychology; Psychology Department, Texas Tech University, Lubbock, Texas, 79409-2051.

P. DeLucia/AAMRL

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2

(1) Date: June 15, 1991

JUN 24 1991

(2) Name: Patricia R. DeLucia, Ph.D.

ASSOCIATESHIP PROGRAMS

(3) Location of tenure: AFSC/Armstrong Aeromedical Research Laboratory (AAMRL)

(4) Dates of tenure: November 1, 1989, through August 31, 1991

(5) Title of research project: Static depth cues and kinetic depth information in the perception of relative distance and collision time of stationary objects during egomotion.

(6) Research advisor: Dr. Rik Warren

(7) N/A

(8) N/A

(9) Programmatic travel during tenure:

Visual Training Effectiveness Work Group of the USAF, Williams AFB, AZ, March, 1990

(10) Scientific seminars, meetings, and/or consultations:

Foreign

Sixth International Conference on Event Perception and Action, Amsterdam, The Netherlands, August, 1991.

Domestic

Symposium on Aviation Psychology, Columbus, OH, May, 1991

Eastern Psychological Association, New York, NY, April, 1991

Human Factors Society, Orlando, FL, October, 1990

Image V, Phoenix, AZ, June, 1990

USAFE Lats Meeting, Wright Patterson AFB, OH, July, 1990.

(11) Lectures:

Miami University, Dayton OH, January, 1990.

(12) Meetings attended by specific invitation (Gave an oral presentation)

Pictorial and motion-based information for depth perception: Theory and applications. Wright State University, Dayton, OH, February, 1991.

Pictorial and motion-based information for depth perception: Design Applications. Federal Aviation Administration: Civil Aeromedical

Institute, Oklahoma City, OK, April, 1991 (Job interview).

Issues in studies of perceived collision, or arrival of moving objects. Presented at the Workshop on the Control of Self-Motion: Methodological Issues, Wright State University, Dayton, OH, August, 1990.

Pictorial depth cues and motion-produced information for depth perception. Visual Training Effectiveness Work Group of the U. S. Air Force, Williams AFB, Phoenix, March, 1990.

(13) N/A

(14) Work in progress:

a) Small near objects can appear farther than large far objects during object-motion and self-motion: Judgments of object-self and object-object collisions. Status: Ready to write up.

b) Optical expansion versus vertical displacement: Judgments of relative arrival time. Status: Ready to write up.

c) Thresholds for optic flow. Status: Data analysis in progress.

d) Pictorial and motion-based information in an active control task. Status: Data collection in progress.

e) Depth perception during action with night vision goggles. Status: data collection in progress.

f) Quantitative tests of the confusion theories: Status: Ready to submit.

(15) Summary of research during tenure:

With simulations of self motion and object motion during self motion, large far objects can appear nearer, and to hit the viewpoint before small near objects-- consistent with pictorial relative size rather than motion-based information. Results are weakened with viewpoints above/below the objects, and generalize to (a) displays with texture, and longer durations, (b) judgments of object-object collisions, (c) active control of altitude during self motion. Thresholds can be measured with staircase procedures, and projected vertical components may contribute to arrival time judgments. Pictorial information must be considered in models of depth perception, and designs of aviation displays.

(16) Publications and papers:

DeLucia, P. R. (1991) Small near objects can appear farther than large far objects during object-motion and self-motion: Judgments of object-object and object-self collisions. Poster at the Sixth International Conference on Event Perception and Action, August.

1. 12 September 1991 RECEIVED
2. DONALD D. W. CHUNG SEP 16 1991
3. Materials Laboratory ASSOCIATESHIP PROGRAMS
Wright-Patterson AFB, OH 45433
4. 1 October 1990-30 September 1991
5. Processing and Characterization of High Tc Superconducting
Thin Films.
6. Dr. P. M. Hemenger
7. N/A
8. N/A
9. N/A
10. American Physical Society meeting, Cincinnati, Ohio
March 18-22, 1991
11. N/A
12. N/A
13. N/A
14. Collecting various experimental data and writing a paper for
publication in a scientific journal
15. The research work has been carried out to determine the
optimum processes to fabricate and properties of high quality
high Tc YBCO ceramic superconducting thin films.
High quality films with critical current densities of 4×10^7
 A/cm^2 at 77K, and a surface resistance of $7 m\Omega$ at 53 GHz
have been consistently fabricated in-situ by means of laser
ablation method under low oxygen pressure.
Film properties determined by AC magnetic susceptibility,
critical current density and x-ray diffraction analyses were

shown to be as a function of substrate materials (SrTiO₃, LaAlO₃, and NdGaO₃), substrate temperature (800°C-500°C), and local oxygen pressures during deposition.

The film processing parameters and the basic mechanisms for the optimized conditions have been established for a possible application in electronic devices and detectors.

16. Research results will be published in Journal of Applied Physics
17. N/A
18. 534 Suisse Dr.
San Jose, CA 95123

Gianna Cauzzi

Sunspot, October 23, 1991

Patents Applied for as a Result of Research as an Associate: N/A.

Future Position and Address: Research Fellowship at the

Dipartimento di Astronomia
Università degli Studi di Firenze
Largo E. Fermi, 5
I-50125 FIRENZE, Italy

Summary of Research During Tenure:

During my tenure at Sac Peak I have mainly worked on the project of Bidimensional Spectroscopy; a good fraction of the time has been devoted to the implementation of the *Narrow Passband Filter*, realized through the coupling of a Fabry-Perot Interferometer and the Universal Birefringent Filter, and to the determination of its characteristics.

The filter is now in operation at the Vacuum Tower Telescope of National Solar Observatory-SP and will be one of the most powerfull tool ever used to investigate the interaction between the gas dynamics and magnetic fields of the solar atmosphere, providing high spatial and spectral resolution observations.

Taking advantage of the period of solar maximum activity, many observations have been performed in young active regions: this will be useful to model (and maybe predict) the development of stressed situations that can lead to explosive phenomena like flares.

In the framework of solar flares, *vector* magnetic fields play a very important role: part of my time has been spent working with the Solar Vector Magnetograph installed at NSO-SP. In particular, I focused my attention on the problem of converting polarization measurements into magnetic fields.

Publications and Papers Resulting from Research as an Associate:

- (1) *Bi-dimensional Spectroscopy with the 20 milliAngstrom filter.* Cauzzi, G. and Smaldone, L.A. (1990). In *Optical Spectroscopic Instrumentation and Techniques for the 1990s*, B.J. McNamara and J.N. Lerner eds., SPIE Vol. 1318, 193, 1990.
- (2) *A new look at the Sun.* Cauzzi, G., Mattei, S., Smaldone, L.A. and Bonaccini, D. (1991). In *Proceedings of Congresso Nazionale Astronet*, Mem. S.A.It., 1991, in press.
- (3) *Narrow Bandpass Filter Solar Observations.* Smaldone, L.A., Cauzzi, G. and Keil, S.L., (1991) Presented at : 21st Meeting of Solar Physics Division of AAS, Huntsville, Alabama, April 9-11, 1991. Bull. Amer. Astron Soc. Vol 23, No. 2, Pag. 54, 1991.
- (4) *A New Method for Calibrating Vector Magnetograms.* Cauzzi, G., Rust, D.M. and O'Byrne, J.W., (1991) Presented at : 21st Meeting of Solar Physics Division of AAS, Huntsville, Alabama, April 9-11, 1991. Bull. Amer. Astron Soc. Vol 23, No. 2, Pag. 51, 1991.
- (5) *Vector Magnetograms of Solar Active Regions During the Max '91 Cooperative Flare research Period.* Rust, D.M. and Cauzzi, G. (1991) Presented at : Spring Meeting of American Geophysical Union, Baltimore MD, May 28-30, 1991. Supplement to EOS, April 23, 1991, Pag. 224.
- (6) *The eruptive flare of April 2 1991.* Rust, D.M. and Cauzzi, G. (1991) Presented at: IAU Colloquium 133 on *Eruptive Flares*. Iguazu, Argentina, August 2-7, 1991. Workshop Proceedings, in press.
- (7) *High Resolutions Observations of Solar Flares.* Smaldone, L.A., Cauzzi, G., Falchi, A. and Falciani, R. (1991). To be presented at : Fall Meeting of American Geophysical Union, San Francisco, California, Dicember 9-13, 1991. October 29 issue of EOS, 1991 in press.
- (8) *On the calibration of line-of-sight magnetograms.* Cauzzi, G., Smaldone, L.A., Balasubramaniam, K.S., Keil, S.L., (1991). Submitted to Solar Physics.
- (9) *Notes on the calibration of the SVMG at NSO-Sac Peak.* Cauzzi, G., NSO Technical Report, 1991-01 (1991).
- (10) *The NSO FPI : tests and set-up notes.* Cauzzi, G., Hegwer, S. and Smaldone, L.A., NSO Technical Report 1991-02 (1991).

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OCT 28 1991

ASSOCIATESHIP PROGRAMS

TERMINATION REPORT

Date: Sunspot, October 23, 1991

Name of the Resident Research Associate: Gianna Cauzzi

Location of Tenure: AFSC/Geophysics Laboratory, Sunspot, NM.

Dates of Tenure: From May 14, 1990 to October 31, 1991.

Title of Research Project:

Determination of solar photospheric dynamics with high spatial resolution observations.

Research Adviser's Name: Dr. Stephen L. Keil.

Are you on Leave from a Professional Post? N/A

International Posts Held during Tenure: N/A.

Programmatic Travel during Tenure: N/A.

Scientific Meetings during Tenure:

- (1) "Optical Spectroscopic Instrumentation and Techniques for the 1990s: Applications in Astronomy, Chemistry and Physics", SPIE Technical Conference, Las Cruces, NM. June 4-6 1990.
- (2) "Solar Polarimetry", 11th NSO-Sacramento Peak Summer Workshop, Sunspot, NM. August 27-31, 1990.
- (3) New Mexico Astronomy Symposium, Socorro, NM, November 30, 1990.
- (4) National Solar Observatory Staff Meeting, Tucson, AZ. January 10-11, 1991
- (5) Meeting of Solar Physics Division of AAS, Huntsville, AL. April 9-11, 1991.
- (6) SEON Upgrade: Vector Magnetograph Operational Requirements and Concepts Meeting, NSO-Sac Peak, Sunspot, NM, April 25-26, 1991.
- (7) Spring Meeting of American Geophysical Union, Baltimore. MD, May 28-31, 1991.
- (8) National Solar Observatory Staff Meeting, Sunspot, New Mexico, September 16-18. 1991.

Seminars or Lectures Delivered at Universities and/or Institutes:

at National Solar Observatory, Sunspot, NM 88349

Title of Seminar: Two-Dimensional Spectroscopy
July 23, 1991.

Meetings attended by specific invitation: N/A.

Teaching as an Associate: N/A.

Work in Progress:

A paper is in preparation with Dr. Dave Rust of Johns Hopkins University-APL, about observations of changing magnetic fields before an eruptive flare. The observations were performed with the JHU-APL Vector Magnetograph installed at NSO-SP.

The narrow Passband Filter installed at the Vacuum Tower Telescope has been very successful in terms of amount and quality of data obtained; the reduction of these data just began, and it will be my major research project for the next year.

- (e) Molecular Structure of 1-Nitro-2-propanol: An Intra-molecular Hydrogen Bond, W.R. Carper, M.E. Zandler and G.J. Mains, J. Amer. Chem. Soc. (to be submitted)
 - (f) Dual Spin Probe Studies of $\text{MeCl-AlCl}_3-\text{EtAlCl}_2$ Melts, W.R. Carper, P.L. Shaw, M.L. Parrish and J.S. Wilkes (in preparation)
- (17) Patents Applied for: None
- (18) Future Position:

Professor of Chemistry
Department of Chemistry
Wichita State University
Wichita, Kansas 67208
(316) 689-3120

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS
SIX-MONTH PROGRESS REPORT

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DEC 02 1991

ASSOCIATESHIP PROGRAMS

Date: Nov 22, 1991

Associate Name: Theodore Sean Tavares

Laboratory: AFSC/Flight Dynamics Laboratory

Location: Wright Patterson AFB, Dayton OH

Starting Date of Tenure June 10, 1991

Adviser Name: Dr. J. Shang

I. <u>Associateship Office Functions</u>	<u>Yes</u>	<u>No</u>
1. Were the pre-start materials and instructions satisfactory?	X	—
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	N/A	—
3. If requested, was the stipend advance available when you began tenure?	X	—
4. Is the stipend being received regularly in a timely way?	X	—
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	X	—
6. Are your questions to this Office being handled courteously and efficiently?	X	—

Comments:

I was very impressed with how easy it was to coordinate the shipment of household goods through the associateship office to my desired schedule, and with the efficiency with which the actual move was handled by the moving company contracted by NRC. over...

II. Laboratory functionsYes No

- | | | |
|---|-------------------------------------|-------------------------------------|
| 1. Was the laboratory ready to receive you and help you get started? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Is the space assigned reasonably adequate? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support?
If so, explain below. | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Are you being encouraged to plan for publication of your research results in referred journals? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 6. Are you able to participate in local seminars, colloquia, etc.? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 8. Have you encountered laboratory influences detrimental to your proposed research? Explain. | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Comments: I have been very satisfied overall with my interaction with the host laboratory, and particularly with my Research Advisor and other members of the Computational Aerodynamics Group. Research interests within the group closely parallel my own, and I have found discussions with group members beneficial to my current investigation.

Brief resume of progress:

Computer codes have been developed for the implementation of an improved low-aspect-ratio wing theory. Results have been obtained for both the steady case, and for unsteady cases involving pitching and plunging maneuvers and flight through gusts. While most of the results obtained so far have been for cases where no leading-edge separation is involved, a preliminary extension to the separated flow case has been made using a semi-empirical separation model. Current efforts are focused on the development of a self-consistent nonlinear description of leading-edge vortex separation to be implemented in the extended slender-wing treatment, and numerical verification of theoretical results using Navier-Stokes CFD codes which are available within the Computational Aerodynamics Group.

Overall general impression is very positive.

Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

RECEIVED

MAY 20 1991

Date: May 15, 1991

Associate Name: SMALDONI LUIGI ANTONIO ASSOCIATESHIP PROGRAMS

Laboratory: AFSC/Geoph. Laboratory

Location: NATIONAL SOLAR OBSERVATORY, SUNSPOT, NM 88349

Starting Date of Tenure NOVEMBER 1, 1980

Adviser Name: STEPHEN L. KEIL

I. Associateship Office Functions

Yes No

1. Were the pre-start materials and instructions satisfactory? —
2. If requested, was the relocation and travel advance handled in a satisfactory manner? —
3. If requested, was the stipend advance available when you began tenure? —
4. Is the stipend being received regularly in a timely way? —
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? —
6. Are your questions to this Office being handled courteously and efficiently? —

Comments:

over...

II. Laboratory functions

	<u>Yes</u>	<u>No</u>
1. Was the laboratory ready to receive you and help you get started?	X	—
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	X	—
3. Is the space assigned reasonably adequate?	X	—
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	—	X
5. Are you being encouraged to plan for publication of your research results in referred journals?	X	—
6. Are you able to participate in local seminars, colloquia, etc.?	X	—
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	X	—
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.	—	X

Comments:

Brief resume of progress: During the first months I performed laboratory tests and tried new set-ups for the Fabry-Perot Interferometer (the basic instrument for my research program). Then, I started the observations of magnetic and velocity fields in solar active regions.

General impression of program to date:

The deep involvement of my adviser and the good observations performed in the last weeks (it's the reason of the delay in this progress report) make me trusting in the achieving the goals of this research.

Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

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SIX-MONTH PROGRESS REPORT

MAY 16 1991

ASSOCIATESHIP PROGRAMS

Date: April 16, 1991

Associate Name: Soo-Man Sim

Laboratory: Air Force Materials Laboratory

Location: WL/MLLM, Wright-Patterson AFB, OH 45433-6533

Starting Date of Tenure October 10, 1990

Adviser Name: R. J. Kerans

I. Associateship Office Functions

Yes No

1. Were the pre-start materials and instructions satisfactory? —

2. If requested, was the relocation and travel advance handled in a satisfactory manner? —

3. If requested, was the stipend advance available when you began tenure? —

4. Is the stipend being received regularly in a timely way? —

5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? —

6. Are your questions to this Office being handled courteously and efficiently? —

Comments:

I am very satisfied with NRC's prominent and efficient handling of my relocation and numerous questions.

over...

II. Laboratory functions

	<u>Yes</u>	<u>No</u>
1. Was the laboratory ready to receive you and help you get started?	X	—
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	X	—
3. Is the space assigned reasonably adequate?	X	—
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	—	X
5. Are you being encouraged to plan for publication of your research results in referred journals?	X	—
6. Are you able to participate in local seminars, colloquia, etc.?	X	—
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	X	—
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.	—	X

Comments: A large research community such as Air Force Materials Lab provides a newly started associate with an excellent work environment. Communications with people having various research background are very helpful to understanding and solving technical problems associated with research.

Brief resume of progress:

Research effort has been focused on the development of new processing method for fabric reinforced ceramic composites via colloidal filtration. Microstructures of composites, which had prepared by slurry infiltration of 3-D woven preforms, were investigated to understand the effects of powder and slurry characteristics on particle packing. Work is underway to evaluate processing defects.

General impression of program to date:
The program is well organized and managed to assist associate's research activities. The research opportunity and freedom given by NRC will contribute not only to my research career but also to the ongoing programs of this laboratory.

Suggestions:

Frequent publication and distribution of news letter to universities and laboratories can bring more qualified scientists interests in participating in NRC associateship program.

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

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SIX-MONTH PROGRESS REPORT

JUL 18 1991

ASSOCIATESHIP PROGRAM

Date: 12 JULY 1991

Associate Name: KENNETH D. SHAW

Laboratory: PHILLIPS LABORATORY (FORMERLY AFWL)

Location: ALM KIRTLAND AFB, NEW MEXICO 87117-6008

Starting Date of Tenure: 14 JAN 1991

Adviser Name: A. GAVRIELIDES

I. Associateship Office Functions

	Yes	No
1. Were the pre-start materials and instructions satisfactory?	X	-
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	X	-
3. If requested, was the stipend advance available when you began tenure?	X	-
4. Is the stipend being received regularly in a timely way?	X	-
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	-	X
6. Are your questions to this Office being handled courteously and efficiently?	X	-

Comments: I INITIALLY EXPERIENCED QUITE A DEGREE OF DIFFICULTY IN GETTING REIMBURSEMENT FOR RELOCATION EXPENSES.

THE FIRST TRAVEL VOUCHER I SUBMITTED WAS SOMEHOW LOST, AND I WAITED FOR SEVERAL WEEKS BEFORE DISCOVERING, THROUGH A PHONE CALL TO YOUR OFFICE, THAT SUCH WAS THE CASE. I THEN HAD TO RESUBMIT THE TRAVEL VOUCHER, WITH THE RESULT THAT I DID NOT RECEIVE THE REIMBURSEMENT CHECK UNTIL ^{over...} SIX WEEKS AFTER I HAD STARTED AT THE LAB. THIS WAS A CONSIDERABLE INCONVENIENCE, SINCE ONE IS CUSTOMARILY SOMEWHAT STRAPPED FINANCIALLY AFTER SUCH A MOVE.
2/3/85

II. Laboratory functions

Yes No

1. Was the laboratory ready to receive you and help you get started? —
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory? —
3. Is the space assigned reasonably adequate? —
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support?
If so, explain below.
—
5. Are you being encouraged to plan for publication of your research results in referred journals? —
6. Are you able to participate in local seminars, colloquia, etc.? —
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings? —
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.
—

Comments: THE STAFF AT THE LAB HAVE BEEN EXTREMELY HELPFUL. I INTERACT FREQUENTLY WITH THE OTHER SCIENTISTS TO DISCUSS NEW DEVELOPMENTS IN MY WORK AS IT PROCEEDS, AND SEVERAL TANGENTIAL INVESTIGATIONS HAVE RESULTED FROM THESE DISCUSSIONS.

Brief resume of progress: PUBLISHED ONE PAPER ON COUPLED WAVE THEORY AS GENERALIZED FROM THAT USED IN STUDYING PHOTOREFRACTIVE WAVE MIXING. TWO PAPERS ARE IN PREPARATION ONE ON RADIONAN DEVELOPMENTS IN UNDERSTANDING THE DYNAMICS OF P.R. (MASS CONJUGATION IN THE RING + DOUBLE PHASE CONJUGATE MIRRORS AND THE OTHER ON FUNDAMENTAL PROPERTIES OF THE DPCM AS RELATING TO THE VECTORIAL NATURE OF THE RADIATION FIELD). ONE EXPERIMENT EXPLORING THE DYNAMICS OF THE DPCM IS ALSO IN PROGRESS. THIS WORK IS DEVIATES SLIGHTLY FROM THE SPECIFIC LINE DETAILED IN THE PROPOSAL, BUT DISCUSSIONS WITH THE RESEARCH ADVISOR + OTHER LAB PERSONNEL IT WAS FELT BY ALL CONCERNED TO BE MORE APPROPRIATE IN LIGHT OF VERY RECENT RECENT DEVELOPMENT.

General impression of program to date: WHICH HAVE OCCURRED IN THE FIELD SINCE I BEGAN TENURE AT THE LAB.

I AM VERY PLEASED WITH THE PROGRAM SO FAR. IN PARTICULAR, I FIND, AS I MENTIONED ABOVE, THE DISCUSSIONS WITH OTHER LAB PERSONNEL TO BE MOST IMPORTANT. THESE PERMIT A VERY MUTUALLY ADVANTAGEOUS EXCHANGE OF IDEAS, WHICH HAS RESULTED IN SOME QUITE NEW AND INTERESTING ASPECTS OF PHOTOREFRACTIVE WAVE MIXING COMING TO LIGHT.

" Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS
SIX-MONTH PROGRESS REPORT

RECEIVED

DEC 24 1991

ASSOCIATESHIP PROGRAMS

Date: 12/14/1991

Associate Name: MICHAEL SCALORA

Laboratory: MICOM

Location: REDSTONE ARSENAL, HUNTSVILLE AL.

Starting Date of Tenure 5/12/1991

Adviser Name: CHARLES M. BOWDEN

I. Associateship Office Functions

- | | <u>Yes</u> | <u>No</u> |
|---|------------|-----------|
| 1. Were the pre-start materials and instructions satisfactory? | ✓ | — |
| 2. If requested, was the relocation and travel advance handled in a satisfactory manner? | ✓ | — |
| 3. If requested, was the stipend advance available when you began tenure? | ✓ | — |
| 4. Is the stipend being received regularly in a timely way? | ✓ | — |
| 5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? | ✓ | — |
| 6. Are your questions to this Office being handled courteously and efficiently? | ✓ | — |

Comments:

over...

II. Laboratory functions

Yes No

1. Was the laboratory ready to receive you and help you get started? —
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory? —
3. Is the space assigned reasonably adequate? —
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support?
If so, explain below.
 —
5. Are you being encouraged to plan for publication of your research results in referred journals? —
6. Are you able to participate in local seminars, colloquia, etc.? —
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings? —
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.
 —

Comments:

Brief resume of progress:
PAPERS SUBMITTED: (1) "QUANTUM FLUCTUATIONS AND DIFFRACTION IN STIMULATED RAMAN SCATTERING," WITH JOSEPH W. HAUS, OPTICS COMMUNICATIONS,

(2) "ULTRAFAST INTRINSIC OPTICAL SWITCHING IN A DENSE MEDIUM OF TWO LEVEL ATOMS," W. TH. MICHAEL E. CRENshaw & CHARLES M. BOWDEN

PHYSICAL REVIEW LETTERS. →

General impression of program to date: I BELIEVE THE PROGRAM PROVIDES EXCELLENT OPPORTUNITIES FOR INDEPENDENT RESEARCH. IN ADDITION, I BELIEVE THAT INTERACTION WITH OTHER ASSOCIATES AND AN EXTREMELY COMPETENT ADVISOR MAKE THIS PROGRAM AN IRREPLACABLE AND INVALUABLE EXPERIENCE.

Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

KIT/AM

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIK-MONTH PROGRESS REPORT

RECEIVED

Date: DEC 8, 1991

DEC 11 1991

Associate Name: DANIEL F. RYDER, JR.

ASSOCIATESHIP PROGRAMS

Laboratory: AFSC/ROME LABORATORY

Location: HANSCOM AFB, MA

Starting Date of Tenure JUNE 10, 1991

Adviser Name: MICHAEL SUSCAGAVE

I. Associateship Office Functions

Yes No

1. Were the pre-start materials and instructions satisfactory?
2. If requested, was the relocation and travel advance handled in a satisfactory manner? N.A.
3. If requested, was the stipend advance available when you began tenure?
4. Is the stipend being received regularly in a timely way?
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?
6. Are your questions to this Office being handled courteously and efficiently?

Comments:

over...

II. <u>Laboratory functions</u>	<u>Yes</u>	<u>No</u>
1. Was the laboratory ready to receive you and help you get started?	✓	—
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	✓	—
3. Is the space assigned reasonably adequate?	✓	—
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	—	✓
5. Are you being encouraged to plan for publication of your research results in referred journals?	✓	—
6. Are you able to participate in local seminars, colloquia, etc.?	✓	—
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	✓	—
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.	—	✓

Comments:

Brief resume of progress:

- * We have demonstrated that rapid thermal processing methods may be utilized to significantly enhance the microstructural development of MOD-derived superconducting thin films.
- * We are currently writing a paper summarizing this finding & will present a paper on the subject at the Am. Ceram. Soc. meeting in April.

General impression of program to date:

The NRC Associate Program is an excellent vehicle to promote University/DoD collaboration. I am fully satisfied with both the technical and administrative support extended to me this past six months.

Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

2 K/ A / 1 / 1 - 1

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

DEC 16 1991

ASSOCIATESHIP PROGRAMS

Date: December 10, 1991

Associate Name: Margaret H. Rakowsky

Margaret H. Rakowsky

Laboratory: Frank J. Seiler Research Laboratory

Location: U.S. Air Force Academy, CO

Starting Date of Tenure June 21, 1991

Adviser Name: John S. Wilkes

I. <u>Associateship Office Functions</u>	Yes	No
1. Were the pre-start materials and instructions satisfactory?	✓	—
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	NA	—
3. If requested, was the stipend advance available when you began tenure?	✓	—
4. Is the stipend being received regularly in a timely way?	✓	—
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? <i>not very promptly for reimbursements</i>	—	✓
6. Are your questions to this Office being handled courteously and efficiently?	✓	—

Comments:

over...

II. Laboratory functions

Yes No

1. Was the laboratory ready to receive you and help you get started? ✓ —
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory? ✓ —
3. Is the space assigned reasonably adequate? ✓ —
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.
If so, explain below. ✓ —
5. Are you being encouraged to plan for publication of your research results in referred journals? ✓ —
6. Are you able to participate in local seminars, colloquia, etc.? ✓ —
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings? ✓ —
8. Have you encountered laboratory influences detrimental to your proposed research? Explain. — ✓

Comments:

The problems have been with instruments that have failed (both the Bruker and JEOL FTNRMs). The laboratory has had the Bruker serviced and has arranged for service for the JEOL. My NMR studies have been slowed by these inconveniences.

Brief resume of progress:

I am conducting variable temperature lithium-7 NMR T₁ studies on the LiCl-buffered chloroaluminate melts. These are giving information on the environment of Li⁺ in the melt and the effect of temperature on the environment. The lithium NMR will be followed by aluminum-27 and carbon-13 T₁ studies.

General impression of program to date:

The program presents an opportunity for scientific exchange between those of us who are "visitors" and the regular employees and Air Force officers in the lab. The program allows us to offer a different perspective based on our background to solving the research problems pursued in the laboratory. The interactions and resulting research results are evidence of the success of the NRC program.

Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: November 1, 1991

RECEIVED

Associate Name: Ruth Pachter

NOV 4 1991

Laboratory: AFSC/Materials Laboratory

ASSOCIATESHIP PROGRAMS

Location: Wright-Patterson AFB, OH

Starting Date of Tenure May 6, 1991

Adviser Name: Dr. W. Wade Adams

I. Associateship Office Functions

- | | <u>Yes</u> | <u>No</u> |
|---|------------|-----------|
| 1. Were the pre-start materials and instructions satisfactory? | X | — |
| 2. If requested, was the relocation and travel advance handled in a satisfactory manner? | N/A | — |
| 3. If requested, was the stipend advance available when you began tenure? | N/A | — |
| 4. Is the stipend being received regularly in a timely way? | X | — |
| 5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? | X | — |
| 6. Are your questions to this Office being handled courteously and efficiently? | X | — |

Comments: The Associateship Programs Office went out of their way to insure that I could start my tenure as soon as possible after I received notification of the award. Special thanks for the great help of Robin Taylor in this matter and also when changing a travel request.

over...

II. Laboratory functions

Yes No

1. Was the laboratory ready to receive you and help you get started?
 2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?
 3. Is the space assigned reasonably adequate?
 4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support?
If so, explain below.
 5. Are you being encouraged to plan for publication of your research results in referred journals?
 6. Are you able to participate in local seminars, colloquia, etc.?
 7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?
 8. Have you encountered laboratory influences detrimental to your proposed research? Explain.

Comments: The collaboration of the Lab's personnel (technical and administrative) has been outstanding. I received every possible help in getting started with my proposed research.

Brief resume of progress: I have been working in collaboration with the experimental researchers in the Lab on the theoretical study and modeling of molecular systems which may exhibit NLO response, particularly polypeptide-bound chromophores of defined secondary structure, cyclic siloxane-based liquid crystals, and various conjugated polymers. I have obtained interesting results, which were summarized as publications in refereed journals.

General impression of program to date: The program has been extremely successful so far. The working environment here is superb. The very high expertise of my advisor and colleagues enabled my rapid progress. The contribution that I have been able to bring to the project may enable the design of new materials in the future.

Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

RECEIVED

APR 29 1991

Date: 15 April 1991

Associate Name: Victoria Tepe Nasman, Ph.D.

ASSOCIATESHIP PROGRAMS

Laboratory: Armstrong Lab, Det-1/HEG

Location: Wright-Patterson AFB, OH 45433

Starting Date of Tenure 15 October 1990

Adviser Name: Glenn Wilson, Ph.D.

I. Associateship Office Functions

Yes No

1. Were the pre-start materials and instructions satisfactory?
2. If requested, was the relocation and travel advance handled in a satisfactory manner? N/A
3. If requested, was the stipend advance available when you began tenure? N/A
4. Is the stipend being received regularly in a timely way?
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?
6. Are your questions to this Office being handled courteously and efficiently?

Comments:

In general, I feel that my appointment with the NRC has been handled efficiently and courteously at all levels.

over...

III. Laboratory functions

	<u>Yes</u>	<u>No</u>
1. Was the laboratory ready to receive you and help you get started?	X	—
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	X	—
3. Is the space assigned reasonably adequate?	X	—
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	—	X
5. Are you being encouraged to plan for publication of your research results in referred journals?	X	—
6. Are you able to participate in local seminars, colloquia, etc.?	X	—
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	X	—
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.	—	X

Comments:

I have encountered no difficulties in acquiring the necessary and needed resources or support.

Brief resume of progress: The first 3-4 mos. of my tenure were spent setting up the necessary hardware/software facilities for the initial phase of my proposed program of research. Over the course of the following 2 mos., we collected data in the first of several planned studies. I will submit a preliminary report (now in progress) on this experiment to the 31st Annual Meetings of the Society for Psychophysiological Research (SPR). I have also participated in the analysis of a related dataset (previously collected) from this lab, and have initiated an additional methodological study of that dataset. I hope this will inform our future decisions

General impression of program to date: regarding data reduction and analysis.

The program is administered well, and provides mutual benefit to the interests of the Air Force laboratory as well as the Associate.

Suggestions: It may be helpful to Associates if host laboratories were to provide a brief tutorial or report concerning the organizational and procedural operations of the hosting institution. I am anxious to learn as much as possible about many of these issues, but am often not even aware what questions I should ask in order to learn. It is particularly valuable to the Associate to have an opportunity to learn more about funding structures and organizational priorities within the AF.

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.



6 Month Report 1 JCL/K
DEPARTMENT OF THE AIR FORCE
ROME LABORATORY (AFSC)
HANSCOM AIR FORCE BASE, MASSACHUSETTS 01731-5000

REPLY TO ERCE
ATTN OF

12 July 1991

SUBJECT:

REC'D.

TO Dr. R. H. Manka
Program Administrator
Associateship Programs
National Research Council
2101 Constitution Avenue
Washington, DC 20418

1991

Dear Dr. Manka,

Thanks for your letter dated 21 June 1991. I understand that you are interested in receiving some kind of an interim report.

Before I go into briefing on my research work I have a comment on the problems I faced during the earlier part of my tenure here. Although I am fairly well settled in my research work I should mention that the transition period was long and difficult. I feel it necessary to mention it here lest it is assumed that everything was perfect. However, I think that it serves no purpose further elaborating on this because I have now gotten used to the system here. The point I want to make here is that considerable amount of precious time and energy have gotten dissipated in the process.

Regarding my research work let me recapitulate and update on my current status. Essentially I had proposed to develop a theoretical model for terrain medium and to use it to interpret the bistatic scattering data available here in this laboratory. After discussions with my advisor Dr. R. J. Papa I have realized that there are some special considerations required in the analysis when the scattering angles are large. It is well known that the notion of 'visibility function' is useful in these situations. However it is clear that the idea of visibility function is itself a crude approximation which can in some cases lead to very erroneous results. Hence one important part of my task is to develop an improved formulation appropriate to our special needs.

As a part of my preliminary investigation I have developed a theoretical model for composite rough surface using the concepts of visibility function. At present I have written this work as a technical report. For your reference I have enclosed a copy of the abstract of this report. From time to time I will keep you informed of further progress in my research work.

Yours truly,
Saba Mudaliar
SABA MUDALIAR

1 Atch
abstract

cc to: Dr. R. J. Papa
RL/ERCP

Abstract

BISTATIC SCATTERING CROSS SECTIONS OF A RANDOMLY ROUGH SURFACE

Saba Mudaliar
12 April 1991

The notion of shadowing is an important consideration in the analysis of scattering from rough surfaces using the Kirchhoff method. A key role is played here by the visibility function which acts as a correction to the 'usual' scattering cross section. The surface under consideration is a normally distributed composite rough surface. Analytical results are provided for the bistatic scattering cross sections. Included herein is a detailed derivation of the visibility function. Some properties of the visibility function are highlighted in a discussion. An important feature of this work is that our expressions for scattering cross sections, in contrast to those of Sancers' (1969), are free from any discontinuities and hence physically more appropriate.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

RECEIVED

JAN 27 1982

ASSOCIATESHIP PROGRAMS

Date: 1/22/82

Associate Name: Dr. Zvi Liron

Laboratory: AFL/Harry G. Armstrong Aerospace Medical Res. Lab.

Location: Dayton, OH

Starting Date of Tenure 8/6/81

Adviser Name: Dr. J. N. McDougal

I. <u>Associateship Office Functions</u>	<u>Yes</u>	<u>No</u>
1. Were the pre-start materials and instructions satisfactory?	✓	—
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	✓	—
3. If requested, was the stipend advance available when you began tenure?	✓	—
4. Is the stipend being received regularly in a timely way?	✓	—
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	✓	—
6. Are your questions to this Office being handled courteously and efficiently?	✓	—

Comments:

over...

II. Laboratory functions

Yes No

- | | | |
|---|---|---|
| 1. Was the laboratory ready to receive you and help you get started? | ✓ | — |
| 2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory? | ✓ | — |
| 3. Is the space assigned reasonably adequate? | ✓ | — |
| 4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support?
If so, explain below.
<i>Delay in supplies</i> | ✓ | — |
| 5. Are you being encouraged to plan for publication of your research results in referred journals? | ✓ | — |
| 6. Are you able to participate in local seminars, colloquia, etc.? | ✓ | — |
| 7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings? | ✓ | — |
| 8. Have you encountered laboratory influences detrimental to your proposed research? Explain. | — | ✓ |

Comments:

Brief resume of progress:

Two abstracts and a full paper have been submitted

Abstracts: 1. Theoretical derivation of a skin-air partition coefficient - SOT, Seattle, Feb. 92

2. Diffusion of water in porcine stratum corneum measured by thermal gravimetric analysis (TGA) techniques. - SID, Baltimore, April 1992

Full paper: Water diffusivity in porcine stratum corneum measured by a thermal gravimetric analysis (TGA) technique. J. Invest. Dermatol.

General impression of program to date: J. Invest. Dermatol.

This program presents a great opportunity to me to concentrate on science. Although the slow supply system forced me to change some of my original plans, I was lucky to find alternative equipment and to gather interesting data in a relatively short time.

Suggestions:

Before starting tenure, the associate will provide a detailed list of supplies including chemicals and disposable items like FTIR windows etc. This will enable a faster and smoother start.

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS
SIX-MONTH PROGRESS REPORT

RECEIVED
AUG 12 1991
ASSOCIATESHIP PROG.

Date: 2 August 1991

Associate Name: Robert M. Gagné

Laboratory: Armstrong Laboratory, AL/HRTC

Location: Brooks AFB TX 78235

Starting Date of Tenure 3 February 1991

Adviser Name: Dr William C. Howell

I. Associateship Office Functions

- | | Yes | No |
|---|-------------------------------------|----|
| 1. Were the pre-start materials and instructions satisfactory? | <input checked="" type="checkbox"/> | — |
| 2. If requested, was the relocation and travel advance handled in a satisfactory manner? | <input checked="" type="checkbox"/> | — |
| 3. If requested, was the stipend advance available when you began tenure? | <input checked="" type="checkbox"/> | — |
| 4. Is the stipend being received regularly in a timely way? | <input checked="" type="checkbox"/> | — |
| 5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? | <input checked="" type="checkbox"/> | — |
| 6. Are your questions to this Office being handled courteously and efficiently? | <input checked="" type="checkbox"/> | — |

Comments:

over...

<u>II. Laboratory Functions</u>	<u>Yes</u>	<u>No</u>
1. Was the laboratory ready to receive you and help you get started?	X	—
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	X	—
3. Is the space assigned reasonably adequate?	X	—
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	X —	—
5. Are you being encouraged to plan for publication of your research results in referred journals?	X	—
6. Are you able to participate in local seminars, colloquia, etc.?	X	—
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	X	—
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.	—	X

Comments:

Brief resume of progress:

Trying out instructions on how to design instruction has begun with an example of a lesson on this topic, which now exists in storyboard form. The example is a procedure -- the functional check of the gun in the F-16 aircraft. Work is underway to devise a computer-based form of the advisory. This development will make possible the collection of data on the facility of use of this type of instruction with Air Force personnel.

General impression of program to date:

The Laboratory Directorate (AL/HR) provides a great deal of help with technical matters, and a cordial group of scientists with research interests in learning, instructional design, and AI applications to training. A stimulating environment, with much going on.

Suggestions:

Ask the Associate applicant to describe briefly what preparatory work and resources of the Laboratory will be needed to make ready for the proposed study. (Purpose: efficiency).

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

RECEIVED

SIX-MONTH PROGRESS REPORT

JUL 13 1991

ASSOCIATESHIP PROGRAM

Date:

Associate Name: BRIAN J. FRASER

Laboratory: Geophysics Directorate, Phillips Labs (AFSC)

Location: Bedford MA

Starting Date of Tenure 24/12/91

Adviser Name: DR. Howard J. Singer

I. Associateship Office Functions

- | | Yes | No |
|---|------------|----|
| 1. Were the pre-start materials and instructions satisfactory? | <u>Yes</u> | — |
| 2. If requested, was the relocation and travel advance handled in a satisfactory manner? | <u>Yes</u> | — |
| 3. If requested, was the stipend advance available when you began tenure? | <u>Yes</u> | — |
| 4. Is the stipend being received regularly in a timely way? | <u>Yes</u> | — |
| 5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? | <u>Yes</u> | — |
| 6. Are your questions to this Office being handled courteously and efficiently? | <u>Yes</u> | — |

Comments:

The NRC associateship program is run very efficiently

over...

II. Laboratory functions

1. Was the laboratory ready to receive you and help you get started?
 Yes —
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?
 Yes —
3. Is the space assigned reasonably adequate?
 Yes —
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.
 No —
5. Are you being encouraged to plan for publication of your research results in referred journals?
 Yes —
6. Are you able to participate in local seminars, colloquia, etc.?
 Yes —
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?
 Yes —
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.
 No —

Comments:

The facilities at the Phillips Laboratory (AFSC) are very good and my research has progressed well.

Brief resume of progress:

Engaged in a program to investigate ion cyclotron waves observed by the recently launched CRRES spacecraft using magnetic, electric fields, and particle data

General impression of program to date:

The program undertaken has been successful in that a very good experimental data set from CRRES is being compiled. This is providing many new results

Suggestions:

—

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

RECEIVED

Date: June 17, 1991

JUN 24 1991

Associate Name: Paul A. Fleitz

ASSOCIATESHIP PROGRAM

Laboratory: AFSC/Materials Laboratory

Location: Wright-Patterson Air Force Base, OH

Starting Date of Tenure December 17, 1991

Adviser Name: Dr. Wade Adams

I. Associateship Office Functions

Yes No

1. Were the pre-start materials and instructions satisfactory? —
2. If requested, was the relocation and travel advance handled in a satisfactory manner? —
3. If requested, was the stipend advance available when you began tenure? N/A —
4. Is the stipend being received regularly in a timely way? —
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? N/A —
6. Are your questions to this Office being handled courteously and efficiently? —

Comments: The Associateship Programs Office went out of their significantly to insure that I could start my tenure very soon after I received notification of the award. Robin Taylor was especially helpful.

over...

II. Laboratory functions

	<u>Yes</u>	<u>No</u>
1. Was the laboratory ready to receive you and help you get started?	X	—
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	X	—
3. Is the space assigned reasonably adequate?	X	—
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	—	X
5. Are you being encouraged to plan for publication of your research results in referred journals?	X	—
6. Are you able to participate in local seminars, colloquia, etc.?	X	—
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	X	—
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.	X	—

Comments: Government procurement has proven to be the single largest impediment to carrying out this research. We have had problems with the laser system that we are using in the experiments that required service from the laser manufacturer. It took nearly six weeks to get the purchase order authorizing the service visit and another four weeks to get the required parts. This lag time has significantly slowed our progress.

Brief resume of progress: I have been working in collaboration with both government and contractors to establish the experimental arrangement of perform Degenerate Four-Wave Mixing experiments. We have been trying to eliminate possible sources of error from the experimental set-up and obtain quantitative results. I have also obtained significant qualitative results using this technique on solutions of diphenyl polyenes. The preliminary results indicate that the nonlinear properties of these materials contain both a fast and a slow nonlinear response. The fast component is due to intrinsic nonlinearities while the slow component has been attributed to thermal effects. I am currently trying to prove these hypotheses.

General impression of program to date:

So far this program has been very successful. I have learned more during the last six months in the Materials Laboratory than during any other time. The working environment here is superb. The expertise of the people working with me on this project makes for rapid progress. The contribution that I have been able to bring to the project has helped to take the experiment into new directions and to support related projects that are under development in the Laboratory.

Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

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NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: 10/15/91

Associate Name: Susan M. Ernst

JAN 27 1992

ASSOCIATESHIP PROGRAMS

Laboratory: Phillips Laboratory

Location: Edwards AFB, CA

Starting Date of Tenure 3/28/91

Adviser Name: Dan Konowalow/Steve Rogers

I. Associateship Office Functions

Yes No

- | | | |
|---|------|---|
| 1. Were the pre-start materials and instructions satisfactory? | X | — |
| 2. If requested, was the relocation and travel advance handled in a satisfactory manner? | # NA | — |
| 3. If requested, was the stipend advance available when you began tenure? | X | — |
| 4. Is the stipend being received regularly in a timely way? | X | — |
| 5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? | NA | — |
| 6. Are your questions to this Office being handled courteously and efficiently? | X | — |

Comments:

over...

i II. Laboratory functions

- | | <u>Yes</u> | <u>No</u> |
|--|------------|-----------|
| 1. Was the laboratory ready to receive you and help you get started? | X | — |
| 2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory? | X | — |
| 3. Is the space assigned reasonably adequate? | X | — |
| 4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below. | — | X |
| 5. Are you being encouraged to plan for publication of your research results in referred journals? | X | — |
| 6. Are you able to participate in local seminars, colloquia, etc.? | X | — |
| 7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings? | X | — |
| 8. Have you encountered laboratory influences detrimental to your proposed research? Explain. | X | — |

Comments:

The lab was a bit short of space but still managed to find a suitable office for me. I also have ample computing resources available to me.

Brief resume of progress:

The first phase of the project has been completed. I am writing a paper for publication and proceeding with additional calculations.

General impression of program to date:

Overall, things are going very well. I have been making good progress on my projects and I am learning a lot from everyone at the lab.

Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

RECEIVED

JUL 7 1991

SIX-MONTH PROGRESS REPORT

ASSOCIATESHIP PROGRAM

Date: 27 June 1991

Associate Name: Thomas Derron

Laboratory: AFSC
AF School of Aerospace Medicine

Location: Brooks AFB, TX

Starting Date of Tenure 2 Jan 1991

Adviser Name: A. A. Pilmanis

I. Associateship Office Functions

Yes No

1. Were the pre-start materials and instructions satisfactory? —
2. If requested, was the relocation and travel advance handled in a satisfactory manner? —
3. If requested, was the stipend advance available when you began tenure? —
4. Is the stipend being received regularly in a timely way? —
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? —
6. Are your questions to this Office being handled courteously and efficiently? —

Comments:

over...

II. Laboratory functions

Yes No

1. Was the laboratory ready to receive you and help you get started? —
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory? —
3. Is the space assigned reasonably adequate? —
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below. —
5. Are you being encouraged to plan for publication of your research results in referred journals? —
6. Are you able to participate in local seminars, colloquia, etc.? —
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings? —
8. Have you encountered laboratory influences detrimental to your proposed research? Explain. —

Comments:

#7 one gas chromatograph available will have to leave one, it is expensive.

#8 I am having difficulty getting my protocol approved by Human Subjects Committee due

Brief resume of progress:

I have been involved in animal studies examining improving survival after high-altitude exposure. These studies began in Feb 1991 and are on-going. Meanwhile, I am waiting for approval on my original protocol and have also written another one for a non-invasive study.

General impression of program to date:

I think the opportunities are terrific, but I am disappointed that, although the laboratory approved my application and agreed to support me I still was not guaranteed to have my protocol approved by their Human Subjects Committee.

Suggestions:

Have applicants submit protocols directly to the lab BEFORE tenure begins so that the applicant can begin work right away (assuming approval has been given) instead of waiting for months like I have. P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

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NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

RECEIVED

DEC 23 1991

Date: 12/18/91

ASSOCIATESHIP PROGRAMS

Associate Name: John G. Bruno, Ph.D.

Laboratory: Armstrong Laboratory, Brooks AFB, AFSC

Location: Brooks AFB, San Antonio, TX. 78235-5000

Starting Date of Tenure 7/1/91

Adviser Name: Dr. Johnathan L. Kiel

<u>I. Associateship Office Functions</u>	<u>Yes</u>	<u>No</u>
1. Were the pre-start materials and instructions satisfactory?	X	—
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	X	—
3. If requested, was the stipend advance available when you began tenure?	X	—
4. Is the stipend being received regularly in a timely way?	X	—
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	Don't know Yet.	
6. Are your questions to this Office being handled courteously and efficiently?	X	—

Comments:

In general the administration of the program has been very good to excellent.

My only real complaint is that the health insurance is next to useless for a young family such as mine. In essence it is a catastrophic coverage with no provisions for health maintenance.

over...

II. Laboratory functions

Yes No

1. Was the laboratory ready to receive you and help you get started? X —
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory? X —
3. Is the space assigned reasonably adequate? X —
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? X —
If so, explain below. Difficulties with reagent/supply acquisition are frequent, but surmountable and Air Force personnel do try to expedite acquisition for me.
5. Are you being encouraged to plan for publication of your research results in referred journals? X —
6. Are you able to participate in local seminars, colloquia, etc.? X —
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings? X —
8. Have you encountered laboratory influences detrimental to your proposed research? Explain. — xx

Comments:

In general my laboratory experience at Brooks has been quite positive. I have access to very sophisticated equipment and stimulating intellectual interactions with both Dr. Kiel and Dr. Parker (my research advisor and the resident molecular biologist respectively).

Brief resume of progress: Great strides have been made toward in situ production of the potential chemiluminescent microwave dosimeter diazoluminomelanin (DALM) in mammalian cells. Adjunct research in the area of nitrite production in leukocytes has also been highly productive. In all, 2 abstracts and 1 paper have thus far been submitted. See attached abstracts.

General impression of program to date:

The program is an excellent opportunity for young, dedicated post-docs to enter and perhaps remain in federal laboratories where they are sheltered from many of the university or industrial burdens and able to focus on well-defined research projects in a stimulating environment.

Suggestions:

If associates were actual temporary federal employees, they might be eligible for HMO coverage?

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: 23rd Aug '91

RECEIVED

Associate Name: GRAHAM BLACK

AUG 30 1991

Laboratory: PHILLIPS LABORATORY

ASSOCIATESHIP PROGRAMS

Location: KIRTLAND AFB, ALBUQUERQUE, NEW MEXICO 87117-600F

Starting Date of Tenure 25 FEBRUARY 1991

Adviser Name: LAVERNE A. SCHLIE

I. Associateship Office Functions

- | | Yes | No |
|---|-------------------------------------|--------------------------|
| 1. Were the pre-start materials and instructions satisfactory? | <input checked="" type="checkbox"/> | (but see below) |
| 2. If requested, was the relocation and travel advance handled in a satisfactory manner? | <input type="checkbox"/> | N.A. |
| 3. If requested, was the stipend advance available when you began tenure? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4. Is the stipend being received regularly in a timely way? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 6. Are your questions to this Office being handled courteously and efficiently? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Comments:

The pre-start materials and instructions were sent by surface mail to England and so were not received prior to starting my appointment in Albuquerque (I surmise that this was the result of insufficient postage for overseas mailing).

III. Laboratory functions

- | | <u>Yes</u> | <u>No</u> |
|---|------------|-----------|
| 1. Was the laboratory ready to receive you and help you get started? | X | — |
| 2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory? | X | — |
| 3. Is the space assigned reasonably adequate? | X | — |
| 4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support?
If so, explain below. | — | X |
| 5. Are you being encouraged to plan for publication of your research results in referred journals? | X | — |
| 6. Are you able to participate in local seminars, colloquia, etc.? | X | — |
| 7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings? | X | — |
| 8. Have you encountered laboratory influences detrimental to your proposed research? Explain. | — | X |

Comments:

Considerable progress has been made in determining the absolute yield of $\text{NH}(\text{A}^3\Pi)$ production in HN_3 decompositions. Brief resume of progress: as well as the luminescent yield of other species produced when HN_3 is decomposed in the presence of other gases. These and other productive interactions with laboratory staff have resulted in several papers currently being prepared for publication. In addition a small program on $\text{O}_2(\text{G}'\Delta_g)$ generation via energy transfer from triplet $(^3\text{G}_0 + ^3\text{G}_0)$ in benzene solvent has enjoyed rapid progress. It is hoped to attempt heterogeneous generation of $\text{O}_2(^1\Delta)$. General impression of program to date: on films of $(^3\text{G}_0 + ^3\text{G}_0)$ in the near future an excellent program - perhaps it should be more widely advertised.

Suggestions:

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instruction for renewing.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

DATE: 1 September 1991

ASSOCIATE NAME: Dr Musiri, A, Badri-Narayanan

LABORATORY: Wright Research & Development Center

STARTING DATE OF TENURE: 11th March 1991

ADVISOR NAME: Dr R. B. Rivir, Aero Propulsion & Power
Directorate

I. <u>Associateship Office Functions</u>	<u>Yes</u>	<u>No</u>
1. Were the pre-start materials and instructions satisfactory?	<u>X</u>	—
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	<u>X</u>	—
3. If requested, was the stipend advance available when you began tenure?	<u>X</u>	—
4. Is the stipend being received regularly in a timely way?	<u>X</u>	—
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	<u>X</u>	—
6. Are your questions to this Office being handled courteously and efficiently?	To a great extent	

Comments: None

<u>II. Laboratory Functions</u>	<u>Yes</u>	<u>No</u>
1. Was the laboratory ready to receive you and help you get started?	<u>X</u>	<u> </u>
2. Is your interaction with your research advisor and the NRC Laboratory Program Representative satisfactory?	<u>X</u>	<u> </u>
3. Is the space assigned reasonably adequate?	<u>X</u>	<u> </u>
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	<u> </u>	<u>X</u>
5. Are you being encouraged to plan for publication of your research results in referred journals?	<u>X</u>	<u> </u>
6. Are you able to participate in local seminars, colloquia, etc.?	<u>X</u>	<u> </u>
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	<u>X</u>	<u> </u>
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.	<u> </u>	<u>X</u>

Comments: Item 4. To procure any item for research the Air Force Laboratory has to go through several procedures which are time consuming. The adviser has to spend a lot of time chasing the papers.

BRIEF RESUME OF PROGRESS; The main aim of the research is to examine the convective heat transfer process in the wall region, the outer flow having high freestream turbulence. It is an experimental investigation. The large water channel with thick sublayer necessary for this work has been designed and it is under fabrication in the machine shop. Instrumentation for heat transfer measurements using multichannel on line date processing system has been set up.

General impression of program to date: The program is on heat transfer mechanism in high turbulent flows encountered in aircraft gas turbines. It is interesting & the work is progressing in the proper direction.

Suggestions: The investigation is experimental in nature & it calls for facilities to be designed and fabricated specially for this work. It will require an additional year to bring the project to a satisfactory stage.

P.S. If you plan on extending your tenure beyond the termination date of your award, please refer to the PPP Booklet on instructions for renewing.

Luigi A. Smaldone

Sunspot, October 22, 1991

Patents Applied for as a Result of Research as an Associate: N/A.

Future Position and Address: Associate Professor at the

Dipartimento di Scienze Fisiche
Università degli Studi di Napoli
Mostra d' Oltremare, Pad. 19
I-80125 NAPOLI, Italy

Summary of Research During Tenure:

The goal of the project is to supply observational bases to the magnetohydrodynamic modeling of solar active regions. The basic physical problem, in this field, is to understand the role of the gases motions in the control of magnetic flux elements, leading to the building-up of magnetic energy, its stress and sudden release (solar flares). A new conception instrument, the *20 milliangstroms filter*, has been used in order to acquire information about the three-dimensional pattern of the photospheric gas flow and the high spatial resolution structure of the magnetic field.

Extensive laboratory tests have been performed on the new filter (based on a capacity controlled Fabry-Perot Interferometer) and different optical interfaces with the National Solar Observatory Vacuum Tower Telescope have been tryed out.

Observations of the active regions magnetic field and velocity field (using 4 different spectral lines in order to have the gas flow at 4 heights, from 40 to 1000 Km, in the solar atmosphere) have been performed in the last March and May. An observing run is still in progress.

Luigi A. Smaldone

Sunspot, October 22, 1991

Publications and Papers Resulting from Research as an Associate:

- (1) *Analysis of solar flares optical spectra. VI.- Velocity fields in the 13 June 1980 flare area.* Falchi, A., Falciani, R. and Smaldone, L.A. *Astronomy and Astrophysics*, 1991 in press.
- (2) *Narrow Bandpass Filter Solar Observations.* Smaldone, L.A., Cauzzi, G. and Keil, S.L., (1991) Presented at : 21st Meeting of Solar Physics Division of AAS, Huntsville, Alabama, April 9-11,1991. Bull. Amer. Astron Soc. Vol 23, No. 2, Pag. 54, 1991.
- (3) *High Resolutions Observations of Solar Flares.* Smaldone, L.A., Cauzzi, G., Falchi, A. and Falciani, R. (1991). To be presented at : Fall Meeting of American Geophysical Union, San Francisco, California, Dicember 9-13, 1991. October 29 issue of *Eos*, 1991 in press.
- (4) *On the calibration of line-of-sight magnetograms.* Cauzzi, G., Smaldone, L.A., Balasubramaniam.K.S., Keil, S.L., (1991). Submitted to Solar Physics.
- (5) *The NSO FPI : tests and set-up notes.* Cauzzi, G., Hegwer, S. and Smaldone, L.A.. NSO Technical Report 1991-02 (1991).